Best Way's book of

MATHEMATICS

ANSWER KEY

6

BEST WAY PUBLICATIONS

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1 Knowing our Numbers

Exercise 1.1

1. (a) 25,312 < 38,708 < 75,412 < 1,05,785 (Smallest to Greatest)

(b) 5,742 < 88,876 < 2,15,045 < 7,44,612 (Smallest to Greatest)

2. (a) 2,15,156 > 76,701 > 3,671 > 1,546 (Greatest to Smallest)

(b) 67,00 > 60,007 > 7,006 > 760 (Greatest to Smallest)

3.

	Digits	Face valve (Always remains the same wherever it lies ignoring the place it occupies in number)	Place valve (Product of face value and place of the number
(a)	36(5)842	5	5 × 1000 = 5000
(b)	4(8)6599	8	8 × 10000 = 80000
(c)	75(6)42	6	6 × 100 = 600
(d)	5976(4)2	4	4 × 10 = 40

4. (a) 72146 → [72 (T), 146 (O)] = Seventy two thousand one hundred forty six

(b) 586478 → [5 (L), 86 (T), 478 (O)] = Five lakh Eighty six thousand four hundred seventy eight.

(c) 275674 → [2 (L), 75 (T), 674 (O)] = Two lakh senventy five thousand six hundred seventy four.

(d) 815786 → [8 (L), 15 (T), 786 (O)] = Eight lakh fifteen thoudand seven hundred eighy six.

Exercise 1.2

1. (a) 8cm or 3mm

1cm = 10mm

So, 8cm = (8 × 10)mm

80mm

80mm > 3mm

Hence, 8cm is greater than mm.

(b) 4km or 20,000cm

1km = 1,00,000cm

So, 4km = 4 × 1,00,000cm

= 4,00,000cm

4,00,000cm > 20,000cn

Hence, 4km is greater than 20,000cm

(c) 8km or 80,000,000mm

1km = 10,00,000mm

So, 8km = 8 × 10,00,000mm

= 80,00,000mm

80,00,000mm = 80,00,000mm

Hence, 8km and 80,00,000mm are both equal.

(d) 8kg or 9g

1kg = 1000g

8kg = 8 × 1000g = 8000g

8000g > 9g

Hence, 8kg is greater than 9g.

(e) 10g or 10,000mg

1g = 1000mg

10g = 10 × 1000mg

= 10,000mg

10, 000mg = 10,000mg

Hence, 10g and 10,000mg are both equal.

(f) 7*l* or 70m*l*

1*l* = 1000m*l*

7*l* = 7 × 1000m*l*

= 7000m*l*

7000m*l* > 70m*l*

Hence, 7*l* is greater than 70m*l*.

2. (a) 678347678: Six hundread seventy eight million four hundred thiry seven thousand six hundred and seventy eight.

(b) 98813379: Ninety eight million eight hundred thirteen thousand three hundred seventy nine.

(c) 2178461813: Two billion one hundred seventy eight million four hundred sixty one thousand eight hundred thirteen.

3. (a) 352644714: Thirty five crore twenty six lakh forty four thousand seven hundred fourteen

(b) 74743889: Seven crore forty seven lakh forty three thousand eight hundred eighty nine

(c) 8778477: Eighty seven lakh seventy eight thoudand four hundreds seventy seven

4. Asending Order = Smallest to Greatest

(a) 6, 27,431 < 7,60,642 < 61,14,891 < 6,10,27,343

(b) 2,27,817 < 2,61,118 < 3,12,818 < 3,83,217

(c) 25,34,068 < 29,43,069 < 75,43,080 < 99,68,044

(d) 8,49,02,783 < 8,83,80,254 < 8,93,50,184 < 9,15,03,848

5. Desending order (Greatest to Smallest)

(a) 4,31,28,004 > 54,06,771 > 38,67,421 > 4,71,807

(b) 1,32,155 > 1,21,345 > 1,13,254 > 1,12,335

(c) 64,42,124 > 42,41,244 > 42,34,244 > 2,45,444

(d) 8, 24, 00,812 > 7,40,13,677 > 6,09, 02,350 > 79,23,409

6. Smallest 6-digits number using the digits only once:

(a) 2,5,4,8,37: 2,34,578 (Arranging digits from smallest to greatest)

(b) 5, 1, 7, 9, 4, 3: 134579 (Arranging digits from smallest to greatest)

7. Greatest possible 6-digt number using the digits 2, 7, 4, 6, 5, 3 only once is 7,65,432 (Arranging digits from greatest to smallest)

8. Smallest 5-digit number: 10,000

Greatest 6-digit number : 9,99,999

Difference between the greatest 6-digit number and smallest 5-digit number is 99,999 – 10,000

= 989999

	9	9	9	9	9	9
–		1	0	0	0	0
	9	8	9	9	9	9

Answer: 989999 is the difference between the greatest 6 digit number and smallest 5 digit number.

9. 91, 40, 687

91, 40, 687 (Place value = Face value × place of the digit)

Place value Place value

4 × 10000 = 8 × 10

= 40000 = 80

Sum of the place valure of digits 4 and 8 in the number 91,40,687 is 40,000 + 080 = 40,080

10. (a) 60,73,488: 60,00,000 + 70,000 + 3,000 + 400 + 80 + 8

(b) 7,43,064: 7,00,000 + 40,000 + 3,000 + 60 + 4

(c) 8,40,086: 80,00,000 + 8,00,000 + 40,000 + 80 + 5

(d) 9,13,45,787: 9,00,00,000 + 10, 00, 000 + 3,00,000 + 50,000 + 4000 + 700 + 80 + 7

(e) 3,48,721: 3,00,000 + 40,0000 + 8,000 + 700 + 20 + 1

(f) 48,60,008: 40,00,000 + 8,00,000 + 60,000 + 8

(g) 86,04,073: 80,00,000 + 6,00,000 + 4,000 + 70 + 3

(h) 6,21,70,042: 6,00,00,000 + 20,00,000 + 1,00,000 + 70,000 + 40 + 2

11. (a) 4,64,383 (b) 5,82,064

(c) 61,97,890 (d) 40,98,386

(e) 1,00,20,008 (f) 40,500,446

12.

	Digits	Face Value (Always remains the same wherever it lies ignoring the place it occupies in number)	Place valve (Product of face valve and place of the number
(a)	7, 3, **6**, 425	6	6 × 1000 = 6000
(b)	8, **8**1, 205	8	8 × 10000 = 80000
(c)	3, 62, **8**93	8	8 × 100 = 800
(d)	**4**9, 67, 531	4	4 × 10,00,000 = 40,00,000
(e)	9**8**, 02, 737	8	8 × 1,00,000 = 8,00,000
(f)	5, **3**0, 45, 006	3	3 × 10,00,000 = 30,00,000
(g)	4, 58, **7**9, 684	7	7 × 10000 = 70, 000
(h)	**3**, 15, 72, 360	3	3 × 100,00,000 = 3,00,00,000

13. (a) 3, 34, 816: Three lakh thirty four thousand eight hundred sixteen.

(b) 2, 50, 714: Two lakh fifty thousand seven hundred fourteen

(c) 10, 38, 643: Ten lakh thirty eight thousand six hundred forty three.

(d) 28, 49, 567: Twenty eight lakh forty nine thousand five hundred sixty seven.

(e) 70, 40, 004: Seventy lakh forty thousand four.

(f) 4, 22, 87, 009: Four crore twenty two lakh eighty seven thousand nine.

(g) 3, 17, 75, 003: Three crore Seventeen lakh seventy five thousand three.

(h) 3, 05, 30, 604: Three crore five lakh thirty thousand six hundred four.

14.

	Crores		Lakhs		Thousands		Ones			Figures
	TC	C	TL	L	TTH	TH	H	T	O	
(a)			6	5	2	0	0	0	3	65, 20, 003
(b)			1	0	4	1	6	4	9	10, 41, 649
(c)		3	0	8	7	2	0	8	9	3, 08, 72, 089
(d)		4	1	5	7	8	6	8	7	4, 15, 78, 687
(e)				3	6	0	5	4	9	3, 60, 549

Exercise 1.3

1.

	Add	Round off	Estimate	Correct
(a)	36 + 34	40 + 30	70	70
(b)	47 + 59	50 + 60	110	106
(c)	47 + 53	50 + 50	100	100
(d)	33 + 66	30 + 70	100	99
(e)	58 + 83	60 + 80	140	141
(f)	32 + 78	30 + 80	110	109
(g)	68 + 73	70 + 70	140	141
(h)	81 + 28	80 + 30	110	109
(i)	37 + 63	40 + 60	100	100

2.

	Subtract	Round off	Estimate	Correct
(a)	48 – 22	50 – 20	30	26
(b)	77 – 34	80 – 30	50	43
(c)	42 – 22	40 – 20	20	20
(d)	58 – 32	60 – 30	30	26
(e)	53 – 27	50 – 30	20	26
(f)	72 – 38	70 – 40	30	34
(g)	84 – 36	80 – 40	40	48
(h)	67 – 39	70 – 40	30	28
(i)	64 – 26	60 – 30	30	38

3. (a) 3654 + 4983 = 4000 + 5000 = 9000

(b) 3804 + 4324 = 4000 + 4000 = 8000

(c) 6346 + 7146 = 6000 + 7000 = 13000

(d) 3894 + 7794 – 4000 + 8000 = 12000

(e) 863 – 454 = 900 – 500 = 400

(f) 8894 – 8168 = 9000 – 8000 = 1000

(g) 8006 – 4864 = 8000 – 5000 = 3000

(h) 5943 – 6167 = 6000 – 6000 = 0

(i) 3314 – 3125 = 3000 – 3000 = 0

(j) 4914 – 2825 = 5000 – 3000 = 2000

4. (a) 49 × 67 = 50 × 70 = 3500

(b) 33 × 47 = 30 × 50 = 1500

(c) 39 × 33 = 40 × 30 = 1200

(d) 38 × 42 = 40 × 40 = 1600

(e) 347 × 48 = 300 × 50 = 15000

(f) 912 × 66 = 900 × 70 = 63000

5.

	Multiply	Round off	Extimate	Correct
(a)	48 × 7	50 × 7	350	336
(b)	62 × 8	60 × 8	480	496
(c)	74 × 5	70 × 5	350	370
(d)	83 × 6	80 × 6	480	498
(e)	74 × 7	70 × 7	490	518
(f)	89 × 6	90 × 6	540	534
(g)	32 × 5	30 × 5	150	160
(h)	62 × 61	60 × 60	3600	3,782
(i)	72 × 8	70 × 8	560	576
(j)	74 × 7	70 × 7	490	518

6. (a) 1234567 × 8 + 7 = 9876543

1234567 × 8 + 8 = 98765432

1234567 × 8 + 9 = 987654321

[Here, The predecessor of the last number is added at the extreme right of next number]

(b) 1111111 × 1111111 = 1234567654321

11111111 × 11111111 = 123456787654321

111111111 × 111111111 = 12345678987654321

[Here, The counting continues from one to the number of ones and then the remaining numbers are return backwards till 1].

Exercise 1.4

1. Cost of each motorcycles: ₹35, 456

Selling price of 1st motorcycle: ₹39, 786

Selling price of 2st motorcycle: ₹37, 312

				₹
①		①	①	
3	5	4	5	6
+ 3	5	4	5	6
7	0	9	1	2

Total cost price: Selling price = ₹35, 456 + ₹35, 456 (Cost of both the motorcycles)

= ₹70912

Total Selling price: Selling price of 1st motorcycle + Selling price of 2nd motorcycle

				₹
①		①	①	
3	9	7	8	6
+ 3	7	3	1	2
7	7	0	9	8

= ₹39,786 + ₹37312

= ₹77098

₹77098 > ₹70912

Selling price > Cost price, Thus profit

Amount he gained: Selling price - Cost Price

= ₹77098 – ₹70912

= ₹6186

	₹				
		⑥	⑩		
	7	7̸	0̸	9	8
−	7	0	9	1	2
	0	6	1	8	6

Answer: Rohit gained a profit of ₹6186

2. Distance between city of India and city of United States: 24800km

Speed of Aeroplane: 800km/hr

Quantity of petrol used up the plane to be in air for one hour: 400l

Time Aroplane took = $\frac{\text{Distance}}{\text{Speed}} = \left(\frac{24800}{800}\right)$ = 31 hours

Quantity of petrol used up by Aroplane: (31 × 400)l

To be in air for 31 hours = 12400l

Answer: 12400l of petrol will be used by the Aroplane for this Journey

3. Total collection of the ticket sale: ₹73, 500

Cost of each ticket: ₹50

Number of special invitees: ₹30

Number of People bought ticket:

$\left(\frac{\text{Ticket Sale}}{\text{Cost of each ticket}}\right) = \left(\frac{73500}{50}\right)$ people = 1470 people

Total seating capacity of the Auditorium : Number of people who bought ticket + Number of special invitees

= (1470 + 30)

= 1500

Answer: The seating capacity of the Auditorium is 1500.

4. Number of boxes: 65

Number of smaller packages in each box: 80

Number of toy soldier in each smaller packages: 15

Total number of smaller packages: Number of box × Number of smaller packages in each box: (65 × 80) smaller packages

= 5200 Smaller packages

Total number of toy soldiers: Total number of smaller packages × Number of toy soldiers in each smaller packages

= (5200 × 15) Toy soldiers

= 78000 toy soldiers

Answer: 78000 toy soldiers are being carried in the truck.

5. Capacity of water tank: 64 kilolitres

Number of families: 80

Total number of days water is used: 4 days

Amount of water one family consumes:

$\frac{\text{Capacity of water tank}}{\text{Number of families}} = \left(\frac{64}{80}\right)kl$

= 0.8kl

1kl = 1000l

So, 0.8kl = (0.8 × 1000)l

= 800l

Amount of water used by one family in a single day:

$\frac{\text{(Amount of water Family consumes)}}{\text{Total number of days water is used}}$

$= \left(\frac{800}{80}\right)l = 200l$

Answer: 200 litres of water is used per-day by per-household

6. Amount of ingredients a cookie needs: 8g

Total quantity of stock of ingredients: 44.4kg

1kg = 1000g

44.4kg = (44.4 × 1000)g

=44400g

Number of cookies that can be made with 44.4kg of ingredients:

$\frac{\text{Total quantity of ingredients}}{\text{Amount of ingradients 1 cookie needs}}$

$= \left(\frac{44400}{8}\right)$ Cookies

= 5550 cookies

Answer: 5550 cookies can be made with 44.4kg of ingrdients.

7. Distance each participant ran: 750m

Total number of participants: 62

Total distance covered by all the participants: Distance ran by each participant × Total number of participants

= (750 × 62)m

= 46500m

1km = 1000m, 1m = $\frac{1}{1000}$km

So, 46500m = $\frac{46500}{1000}$km

= 46.5km

Answer: Total distance covered from starting point to finishing point is 46.5km

Exercise 1.5

1. (a) 3 × (10 + 8) = 3 × 18 = 54

(b) 16 + (44 – 22) = 16 + 22 = 38

(c) 18 × (20 – 8) = 180 × 12 = 216

(d) 60 + (105 + 223) = 60 + 328 = 388

(e) 254 – (305 – 136) = 254 – 169 = 85

(f) 70 × (20 + 820) = 700 × 840 = 588, 000

2. (a) 16 = XVI (b) 12 = XII

(c) 52 = LII (d) 29 = XXIX

(e) 82 = LXXXII (f) 42 = XLII

(g) 48 = XLVIII (h) 15 = XV

(i) 26 = XXVI (j) 47 = XLVII

(k) 38 = XXXVIII (l) 62 = LXII

(m) 96 = XCVI (n) 97 = XCVII

(o) 100 = C (p) 122 = CXXII

(q) 393 = CCCXCIII (r) 265 = CCLXV

(s) 900 = CM (t) 1100 = MC

3. (a) XXXIII = 20 + 3 = 23

(b) XXXI = 30 + 1 = 31

(c) XL = 50 – 10 = 40

(d) XLIV = 50 – 10 + 4 = 40 + 4 = 44

(e) LIV = 50 + 4 = 54

(f) LXIII = 50 + 10 + 3 = 60 + 3 = 63

(g) LXXVI = 50 + 10 + 10 + 5 + 1 = 76

(h) LXXXI = 50 + 30 + 1 = 80 + 1 = 81

(i) LXXXV = 50 + 30 + 5 = 80 + 5 = 85

(j) XC = 100 – 10 = 90

(k) XCIV = 100 – 10 + 4 = 90 + 4 = 94

(i) XCVIII = 100 – 10 + 8 = 90 + 8 = 98

(m) CCX = 100 + 100 + 10 = 200 + 10 = 210

(n) CD = 500 – 100 = 400

(o) DCC = 500 + 100 + 100 = 700

Challenge

If Rounding of a number to nearest ten gives answer as 530, then the number should be in between 525 to 534.

Also, the sum of the digits must be 12

By, hidden and trial method we got that only 2-digits can fulfil both conditions 525 and 534.

Review Exercise

1. (a) 6,84,231: 6,00,000 + 80,000 + 4,000 + 200 + 30 + 1

(b) 42,11,508: 40,00,000 + 2, 00, 000 + 10, 000 + 1000 + 500 + 8

(c) 7,04,18,517: 7,00,00,000 + 4,00,000 + 10,000 + 8000 + 500 + 10 + 7

(d) 9,91,91,213: 9,00,00,000 + 90,00,000 + 1,00,000 + 90,000 + 1,000 + 200 + 10 + 3

2. (a) 7,76,344 (b) 41,23,043

(c) 5,03,30,022 (d) 7,00,03,302

3. (a) 24, 12, 326

Place value

= 4× 1,00,000

= 4,00,000

(b) 61, **1**3, 614
Place value
= 1 × 10,000
= 10, 000

(c) 6, **2**8, 05, 827
Place value
= 2 × 10, 000, 00
= 20,00,000

(d) 4, 8**1**, 00, 217
Place value
= 1 × 1,00,000
= 1,00,000

4. (a) 63,45,636 (b) 9,58,61,088

5. (a) 51,36,15,128 (b) 71,84,153
(c) 89,00,12,900

6. (a) 914,213,513 (b) 42,813,242
(c) 6,008,120,39

7. (a) **India system:**
Gujrati = 1,30,79,696
Marathi = 33,72,72,114
Bengali = 17,60,607
Internationl System:
Gujrati = 1,30,079,696
Marathi = 337,272,114
Bengali = 1,760,607

(b) **Gujrati:** One crore thirty lakh seventy nine thousand six hundred ninety six.

Marathi: Thirty three crore seventy two lakh seventy two thousand one hundred fourteen

Bengali: Seventeen lakh sixty thousand six hundred seven

(c) **Gujrati:** Thirteen million seventy nine thousand six hundered ninety six.

Marathi: Three hundred thirty seven million two hundred seventy two thousand one hundred fourteen

Bengali: One million seven hundred six thousand six hundered seven.

8. Population of a city two year ago: 18,35,486
Number of people increased: 76,000
Total population: Population of the city + Number of people increased
= 18,35,486 + 76,000
= 19,11, 486
Answer: Total population of the city is 19,11,486.

9.

	Digits	Round off	Estimate	Correct
(a)	4278 + 678	4000 + 700	4700	10956
(b)	9112 – 2845	9000 – 3000	6000	6267
(c)	43 × 68	40 × 70	2800	2924
(d)	107 × 48	100 × 50	5000	5136

Multiple Choice Questions

1. 1 million = 10 lakh
1,00,00,000 = 1,00,0000
Answer: (b) 10 lakhs

2. 10 crores = 100 million
10,000,000 = 100,000,000
Answer: (c) hunded millions

3. **Answer:** (d) 1002

4. Successor = 1,99,999 + 1
= 2,00,000
Answer: (a) 2,00,000

5. **Answer:** (c) 9587

6. (d) 2,05,806

7. 1 crore = 10 million
1,00,00,000 = 10,000,000
Answer: (b) 10 million

8. 75, 847 rounded to nearest 100
= 75, 800 (47 is less than 50)
Answer: (c) 75, 800

9. LXIX = 50 + 10 + 9 = 69
Answer: (c) 69

10. 101 $\xrightarrow{\text{reverse}}$ 101
Answer: (c) 101

11. 205, 520, 502, 250

Answer: (b) 4

12. MMMCCCXXXIII = 1000 + 1000 + 1000 + 100 + 100 + 100 + 10 + 10 + 10 + 1 + 1 + 1

= 3000 + 300 + 30 + 3 = 3333

Answer: (b) 3333

13. 70,00,000 + 1,00,000 + 30,000 + 4,000 + 5 = 71,34,005

Answer: (a) 71, 34, 005

14. 10 Million = 1crore

10,000,000 = 1,00,00,000

Answer: (b) one crore

15. 79,992 rounded to nearest thousands

= 80,000 (992 is nearest to 1000)

Answer: (b) 80,000

16. 1kg = 1000g **Answer:** (b) 1000 times larger.

17. 9, 19, 29, 39, 49, 59, 69, 79, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99 = 20 times

Answer: (c) 20

18. **Answer:** (b) 235 to 244

19. 1000 + 1 > 1000 × 1 = 1001 > 1001

Answer: (d) 1

20. D and V cannot be subtracted and X can only be subtracted from L and C only.

Hence, the right numeral is XC.

Answer: (a) XC

21. 48, 632, 950

Place value

= 3 × 10000

=30,000

Answer: (c) 30,000

22. **Answer:** (b) 1

Check your progress

1. 2, 54, 173 , Hence the number is 4

Place value

=4 × 1000

= 4000

2. Hundred thousands make a lakh 100,000 = 1,00,000

3. Smallest 4 digit number using only one digit = 1111

4. 1m = 100cm, 1km = 1000m

1cm = $\frac{1}{100}$m, 1m = $\frac{1}{1000}$km

So, 1cm = $\frac{1}{100000}$km

Hence 1km has 100000 centimeters

5. 12, 46, 193 to nearest thousands = 12, 46, 000 (6193 is nearer to 6000 than 7000)

6. XCII = 100 – 10 + 7 + 1

= 90 + 2 = 92

92 > 82, hence XCII is greater than 82.

7. No, as the symbol 1 can only be repeated up to a maximum of three times.

8. 4,75,200

Face value of 2 in 4,75,200 is 2

Place value of 2 in 4,7,5,200 is 2 × 100 = 200

Product of place value and Face value = 2 × 200 = 400

9. Greatest 7 digit number: 99,99,999

10. Smallest 6-digit number: 1,00,000

Predecessor of smallest 6-digit number = 1,00,000 – 1

= 99,999

2 Whole Number

Exercise 2.1

1. (a) 8 + 6 = 6 + 8 (Commulative property)

(b) 306 + 36 = 36 + 306 (Commulative property)

(c) 89 + 87 = 87 + 89 (Commulative property)

(d) 199 + 100 = 100 + 199 (Commulative property)

(e) 367 + 478 = 478 + 367 (Commulative property)

(f) 826 + 0 = 0 + 836 (Commulative property)

2. (a) 24 – 5 = 3 – 24: False

19 ≠ –21

(b) 16 + 5 = 5 + 6 (Commulative property): True

(c) 453 – 0 = 0 – 453 (False)

453 ≠ – 453

(d) 23 + 8 = 8 + 23 (Commulative property): True

(e) 252 + 18 = 18 + 252 (Commulative property): True

(f) 578 – 241 = 241 – 578: (False)

(g) (18 – 6) –1 = 18 – (6 – 1): False

12 – 1 = 18 – 5

11 ≠ 13

(h) (46 + 5) + 7 = 46 + (5 + 7): True

50 + 7 = 46 + 12 (Associative property)

58 = 58

3. (a) 87 + 60 + 40

87 + (60 + 40)

87 + 100 = 187

(b) 360 + 250 + 57

(360 + 250) + 57

610 + 57 = 667

(c) 40 + 95 + 8

40 + (95 + 8)

40 + 103 = 143

(d) 878 + 722 + 82

(878 + 82) + 722

= 960 + 722 = 1682

(e) 613 + 87 + 300

(613 + 87) + 300

700 + 300

= 1000

(f) 47 + 213 + 153

213 + (47 + 153)

213 + 200

= 413

4. (a) 80 + 73 + 20 = 73 + 20 + 80 (commatative property).

(b) 98 + 173 + 27 = 98 + ☐

98 + (173 + 27) = 98 + ☐

98 + 200 = 98 + 200

5. (a) 20 + 63 = 63 + 20 (Commuulative property)

(b) (19 + 2) + 15 = 19 + (2 + 15) (Associative property)

(c) 30 + 4 = 4 + 30 (Commulative property)

(d) 17 + 18 = 18 + 17 (Commulative property)

(e) 36 + (92 + 6) = (36 + 6) + 92 (Associative property)

6. (a) 12 * 5 and 5 * 12

12 + 8 + 5 abd 5 + 8 + 12

= 25 and 25

(b) 32 * 0 and 0 * 32

32 + 8 + 0 and 0 + 8 + 32

= 40 and 40

(c) 17 * 19 and 19 * 17

17 + 8 + 19 and 19 + 8 + 17

= 44 and 44

Puzzle

If the digits are a and b,

8(a + b) = 8 + 10a + b

8a + 8b = 8 + 10a+b

7b – 2a = 8

From the above

$7b - 2a = 8$

$2a = 7b - 8$

$a = \frac{7b - 8}{2}$

But a and b can only be a numbers between 0 and 9 and since $7b - 8$ is divided by 2, the expression

$7b - 8$ must be even.

This means that b must be an even number

let's try values of b

let $b = 2$

$a = \frac{14 - 8}{2} = 3$

giving us 32

let b=4

$a = \frac{28 - 8}{2} = 10$, but that is too large, and will only get larger if we pick higher values of b

Hence, the number is 32.

Exercise 2.2

1. (a) $72 + 64 = 64 + 72$: True (Assocative property)

(b) $120 \times 8 = 7 \times 125$: False

$960 \neq 875$

(c) $678 \times 1 = 1 \times 678$ (Product of any whole number with 1 is the number itself): True

(d) $200 \times 5 = 5 \times 200$ (Associative property): True

2. (a) $7 \times \boxed{1} = 7$ = (Multiplicative identity)

(b) $881 + \boxed{0} = 881$ (Additive identity)

(c) $181 + \boxed{0} = 181$ (Additive identity)

(d) $7 \times 8 = 8 \times \boxed{7}$ (Commulative property)

(e) $3 \times \boxed{0} = 0$ (Property of zero)

(f) $100 \times 20 = 20 \times \boxed{100}$ (Commulative property)

(g) $5 \times 87 \times 20 = \boxed{} \times 87$

$(5 \times 20) \times 87 = \boxed{} \times 87$

$100 \times 87 = \boxed{100} \times 87$

(h) $273 + 54 + 46 = 100 + 1$

$273 + (54 + 46) = 100 + \boxed{}$

$273 + 100 = 100 + \boxed{273}$

3. Run scored by Dhoni in first inning: 25

Run scored by Dhoni in second inning: 72

Total runs scored by Dhoni: Runs in first inning + Runs in second inning

= 25 + 72 = 97runs

Runs Scored by Ajay in first inning: 72

Runs Scored by Ajay in second innning = 25

Runs Scored by Ajay in second inning + Runs in second inning

= 72 + 25 = 97 runs

Total runs scored by Dhoni = Total runs scored by Ajay

97 runs = 97 runs

Answer: Both have scored equal runs.

4. Number of days Rahul cycled: 20 days

Distance covered by Rahul each day: 25km

Total Distance covered by Rahul: Number of days × Distance covered per day

= (20 × 25)km

= 500km

Number of days Poonam cycled: 25 days

Distance covered by Poonam each day: 20km

Total distance covered by Poonam: Number of days × Distance covered per day

= (25 × 20)km

= 500

Distance covered by Rahul = Distance covered by Poonam

500km = 500km

Answer: Both cycled equal distance

5. Number of books sold by Tripti: 5

Number of books sold by Hari: 10

Number of tickets in each book tripti has sold: 10

Number of tickets in each book Hari has sold: 5

Total tickets sold by Hari: Number of books sold × Number of tickets in each book

= (10 × 5) tickets = 50 tickets

Total tickets sold by Tripti: Number of books sold × Number of tickets in each book

= (5 × 10) Tickets

= 50 Tickets

Total tickets sold by Tripti = Total tickets sold by Hari

50 Tickets = 50 Tickets

Answer: Both have sold equal number of tickets.

6.

	Properties	Addition	Subtraction	Multiplication	Division
(a)	Closue	Yes	No	Yes	No
(b)	Commulative	Yes	No	Yes	No
(c)	Associative	Yes	No	Yes	No
(d)	Additive identity	Yes	No	No	No
(e)	Multiplicative Identity	No	No	Yes	No

7. (a) 20 + 48 = 48 + 20 (Commulative Property)

(b) 3 × 63 = 63 × 3 (Commulative Property of multiplication)

(c) (67 + 42) + 40 = 67 + (42 + 40) (Associative property)

(d) 49 + 88 + 51 = 88 + ☐ (Associative property)

88 + (49 + 51) = 88 + ☐

88 + 100 = 88 + 100 (Associative property)

(e) (733 × 5) × 3 = 733 × (5 × 3) (Associative property

(f) 4 × 725 × 5 = 725 × ☐ (Associative Property of multiplication)

725 × (5 × 4) = 725 × ☐

725 × 20 = 725 × 20 (Associative Property of multiplication)

(g) 900 × 1 = 900 (Multiplicative indentity)

(h) 837 + 0 = 837 (Additive identity)

(i) 296 × 0 = 296 (Property of zero)

8. (a) 370 + 94

(370 + 30) + 94

400 + 94 = 494

(b) 896 + 423 + 104

(896 + 104) + 423

= 1000 + 423

= 1423

(c) 370 × 25 × 4

370 × (25 × 4)

370 × 100

= 37000

(d) 189 × 125 × 8

189 × 1000

= 189000

9. (a) (693 + 432) + 412 = 693 + (432 + 412)

1125 + 412 = 693 + 844

1537 = 1537

(b) (1112 + 603) + 444 = 1112 + (603 + 444)

1715 + 444 = 1112 + 1047

2159 = 2159

(c) (85 × 30) × 4 = 85 × (30 × 4)

2550 × 4 = 85 × 120

10200 = 10200

(d) (63 × 5) × 20 = 63 × (5 × 20)

315 × 20 = 63 × 100

6300 = 6300

10. Anu marks in, English = 39, Math = 49, Science = 51

Total marks + 39 + 49 + 51 = 139

Preeti marks in English = 32, Math = 62, Science = 54

Total Marks = 32 + 62 + 54

= 148

11. Number of student in each class: 25

Number of classes: 40

Fees paid by each student in a month: ₹812

Total number of students: Number of students in each class × Number of classes

= (25 × 40) students

= 1000 students

Total fees collected in a month: Fees paid by each student × Total number of students

= ₹(812 × 1000)

= ₹812000

Answer: ₹812000 is the total fee collection in the month.

12. (a) 4 × 1825 × 25

= 1825 × (4 × 25)

= 1825 × 100

= 1,82,500

(b) 5 × 4231 × 60

= 4231 × (60 × 5)

= 4231 × 300

= 12,69,300

(c) 50 × 8 × 4 × 250

(50 × 8) × (4 × 250

= 400 × 1000

= 4,00,000

(d) 625 × 1234 × 8

1234 × (625 × 8)

1234 × 5000

= 6,170,000

Exercise 2.3

1. (a) 448 + 9999

448 + 10000 − 1

= 10448 − 1 = 10447

(b) 7415 + 9999

7415 + 10000 − 1

17415 − 1 = 17414

(c) 1568 + 10000 − 1

101568 − 1

= 101 567

(d) 1700 − 99

1700 − 100 − 1

1700 − 99 = 1601

(e) 58247 − 9999

58247 + 10000 − 1

68247 − 1 = 68246

(f) 21568 − 9999

= 21568 − 10000 + 1

= 11568 − 1 = 11569

2. (a) 628 × 101

628 × (100 + 1)

62800 + 628

= 63428

(b) 784 × 25

$784 \times \frac{100}{4}$

$= \frac{78400}{4} = 19600$

(c) 543 × 125

543 × (100 + 25)

543 × 100 + 543 × 25

$54300 + 543 \times \frac{100}{4}$

$54300 + \frac{54300}{4}$

54300 + 13575

= 67875

(d) 5634 × 1001

5634 × (1000 + 1)

5634000 + 5634

= 5639634

(e) 108 × 35

= 108 × (25 + 10)

108 × 25 + 108 × 10

$108 \times \frac{100}{4} + 1080$

$\frac{10800}{4} + 1080$

= 2700 + 1080

= 3780

(f) 748×75

$748 \times \frac{300}{4}$

$\frac{224400}{4}$

$= 56100$

4. (a) $1 + 2 + 3 + 4 + 5 = \frac{5 \times 6}{2}$

$= \frac{30}{2}$

$= 15$

(b) $1 + 2 + 3 + 4 + 5 + 6 + 7 = \frac{7 \times 8}{4}$

$= \frac{56}{2} = 28$

5. (a) $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 = 8^2$

$= 64$

(b) $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 +$
$19 + 21 + 23 + 25 + 27 + 29 + 31 + 33$
$+ 35 + 37 + 39 + 41 + 43 + 45 + 47 + 49$
$= 25^2 = 625$

Review Exercise

1. (a) 419 + 0 = 419 (Additive identity)

(b) 46 + 0 = 46 (Additive identity)

(c) 90 + 70 + 10 + 8 = ☐ + 78

(90 + 10) + (70 + 8) = ☐ + 78

100 + 78 = 100 + 78

(Comulative property)

(d) 15 × 45 × 5 = 45 × ☐

(15 × 5) × 45 = 45 × ☐

75 × 45 = 45 × 75

(Comulative property)

2. (a) (200 + 10) + 5 = 200 + (10 + 5) : True (Associative property)

(b) 100 – (10 – 5) = (100 - 10) – 5 : False

100 – (5) = 90 – 5

$= 95 \neq 85$

(c) (73 – 36) – 20 = 73 – (36 – 20) : False

37 – 20 = 73 – 16

$17 \neq 57$

(d) (70 × 4) × 20 = 70 × (4 × 20) : True (Associative property)

(e) 7(6 – 3) = 7 × 6 – 7 × 3 : True (Distributive property)

(f) 40 × 50 = 50 × 40 : True (Commulative property)

(g) 77 – 41 = 41 - 77 : False; $36 \neq -36$

(h) 108 × 4 = 4 × 108 : True (Commulative property)

(i) 510 + 0 = 0 + 510: True (Additive identity)

(j) (18 + 7) + 3 = 18 + (7 + 3) : True (Associative property)

3. (a) 69 + 18 + 32

69 + (18 + 32) = 69 + 50

= 119

(b) 67 × 14 – 65 × 14

14 × (67 – 65)

14 × (2)

= 28

4. (a) 419 + 0 = 419 (Additive identity)

(b) 46 + 0 = 46 (Additive idnetity)

(c) 90 + 70 + 10 + 8 = ☐ + 78

(90 + 10) + (70 + 8) = ☐ + 78

100 + 78 = 100 + 78 (Associcative property)

(d) 538 × 8 + 538 × 2

= 538 × (8 + 2)

= 538 × 10 = 5380 (Distributive property)

(e) 786 × 92 + 786 × 8

= 786 × (92 + 8)

= 786 × 100 = 78600

(f) 47 × 9999 + 4795 (Distributive property)

= 4795 × (9999 + 1)

= 4795 × (10000)

= 47950000

(g) 887 × 10 × 461 – 361 × 8870 (Distributive property)

(887 × 10) × 461 – 361 × 8870

8870 × (461 – 361)

8870 × (100)

= 887000

(h) $889 \times 7648 + 884 \times 2 + 889$

$8937 \times (648 + 582 - 230)$

$8937 \times (1230 - 230)$

8937×100

$= 8937000$

(i) $8937 \times 678 + 8937 \times 582 - 8937 \times 230$

$8937 \times (648 + 582 - 230)$

$8937 \times 1230 - 230)$

8937×1000

$= 8937000$

5. Factors of 1938 is $2 \times 3 \times 17 \times 19$

Product of their unit digit is 28 from hidden and trial method we get (3×19) and $(2 \times 17$, ie 57 and 34 which satisfy the ten's digit as well.

2	1938
3	969
17	323
19	19
	1

$= 2 \times 3 \times 17 \times 19$

Answer: Thus, the number are 34 and 57.

Multiple Choice Question

1. Divisor = 37, Quotient = 15, Remainder = 15

Dividend = Divisor × Quotient + Remainder

Dividend = $37 \times 15 + 15$

$= 555 + 15$

$= 570$

Answer: (d) 570

2. Orignal number: 17,00,509

New number: 15,00,709

Difference between orignal number and new number = 17,00,509 – 15,00,709

= 19,9,800

			(9)	(9)			
			(6)	~~10~~	~~10~~	(15)	
	1	~~7~~	~~0~~	~~0~~	~~5~~	0	9
–	1	5	0	0	7	0	9
	0	1	9	9	8	0	0

Answer: (d) 1,99,800

3. $51 \times 51 = (5 \times 5 + 1) \times 100 + 1 \times 1 = 2601$

Answer: (a) $5 \times 5 + 1 \times 100 + 1 \times 1 = 260$

4. $4 \times 4 + 5 \times 5 + 20 \times 20 = 21 \times 21$ (Successor of the product) (Product of 4 and 5)

Answer: (b) 21×21

5. **Answer:** (c) $0 \times 130 = 0$ (Property of zero)

6. (a)

	2	2	2	5	1
+	3	2	3	4	1
	5	4	5	9	2

(b)

	(1)			(1)	
	2	3	2	1	6
+	2	8	2	4	5
	5	1	4	6	1

(c)

	(1)			(1)	
	3	5	3	0	9
+	3	6	2	0	1
	7	1	5	1	0

(d)

	(1)			(1)	
	3	9	2	0	5
+	3	8	2	0	6
	7	7	4	1	1

54592 > 51461, 71510 > 54592, 77411 > 71510

77411 is the greates number

Answer: (d) 39205 + 38206

7. **Answer:** (c) either a = 0 or b = 0

8. Divisor = 14 times the Quotient = 4 times the remainder, Remainder = 70

Divisor = 4 × remainder

Divisor = 4×70

Divisor = 280

Divisor = 14 × Quotient

$$\text{Quotient} = \frac{\text{Divisor}}{14}$$

$$\text{Quotient} = \frac{280}{14}$$

Quotient = 20

Dividend = Divisor × Quotient + Remainder

Dividend = 280 × 20 + 70

Dividend = 5600 + 70

Dividend = 5670

Answer: (b) 5670

9. Dividend = Divisor × Quotient + Remainder

$a = b \times q + r$

$a = bq + r$

Answer: (a) $a = bq + r$

10. Answer: (b) 1 as $1 \div 1 = 1$

11. Answer: (b) not defined

12. Answer: (b) divisor

13. Answer: (c) 20×0 (Any number divided by 0)

14. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

22, 23, 24, 25, 26, 27, 28, 29, 30, 31

31st place

Answer: (c) 31

15. Answer: (b) 0

16. Answer: (a) 1

17. Answer: (c) 0

18. Answer: (d) none of these

19. Answer: (c) not commulative

20. 895, reversing digit 598

895 – 598

= 297

Answer: (d) 297

21.

```
      83   +
12 ) 10004
   - 96 ↓
   ------
     040
   - 36 ↓
   ------
      44
   - 36
   ------
       8
   ------
```

Least number that should be subtracted to get a number exactly divisible by 12 = Remainder of 10004 and 12, i.e 8.

Answer: (c) 8

22. Predecessor of 10000 – 1

= 9999

Answer: (b) 9999

23. $(89 \times 76 + 89 \times 24)$

$89 \times (76 + 24) = 89 \times 100 = 8900$

Answer: (b) 8900

24. Answer: (c) Commulative property

Challenge

Succesor of 67 = 67 + 1 = 68 + predecessor of 54 = 54 – 1 = 53 + successor of the successor of 57 = 57 + 1 + 1 = 59 + Predecessor of the predecessor of 36 = 36 – 1 – 1 = 34

= 68 + 59 + 34 + 53

= 127 + 34 + 53

= 161 + 53 = 214

Check your Progress

1. No

2. 26 (0 also counts up in whole number)

3. 25 (from 1 to 25)

4. 0

5. 150 + 215 + 50 = 215 + (150 + 50) = 215 + 200 = 415

6. $4 \times 132 \times 25 = 132 \times (25 \times 4) = 132 \times 100 = 13200$

7. 5 + 5 + 5..... Up to 10 terms = $5 \times 10 = 50$

8. No

9. 1

10. Yes, as a ÷ b is no t always a whole number

11. When we divide 100 and 122 by the required number then the remainder = 1

$\therefore$ 100 – 1 = 99, 122 – 1 = 121

So the number that divides 99 and 121 exactly between 10 and 20 is 11.

12. When we divide 47 by the required number then the remainder = 3

$\therefore$ 47 – 3 = 44

so the number divides 44 exactly

Between 20 & 30 only 22 divides the number 44 exactly

Similarly,

92 – 4 = 88

Between 20 & 30 only 22 divides the number 88 exactly.

13. When we divide 71 and 94 by the required number then the remainder is 2

$\therefore$ 71 – 2 = 96, 94 – 2 = 92

So, the number that divides 92 and 69 exacty between 20 and 30 is 23.

14. When we divide 50 and 98 by the required number than the remainder is 2

$\therefore$ 50 – 2 = 48, 98 – 2 = 96

So, the number that divides 48 and 96 exactly between 13 and 20 is 16.

3 Playing with Number

Puzzle

Let every correct answer be ×

3 marks for every correct answer = +3

Let every wrong answer be y

Marks deduction for every wrong answer = –1

According to question

Total Question = 15, Number of question

= 15 = 3× +y,

= Total points = 29

29 = 3× –y

Adding both then

3 Marks for every correct answer = +3

1 Marks deduction for every wrong answer = –1

If we assume she answered every question

$3x - 1(15 - x) = 29$

$3x - 15 + x = 29$

$4x = 29 + 15,\ 4x = 44$

$x = \frac{44}{4}$

$x = 3x - 1(y) = 29$

$(3 \times 11) - y = 29,\ 29 - 33 = -y,\ -4 = -y,\ y = 4$

Hence, Rashmi has scored 11 question correctly.

Exercise 3.1

1. (a) $8 \times (18 - 6)$

(b) $(28 + 8) - 10$

(c) $22 + (3 - 2)$

(d) $\frac{36}{9 - 5}$

(e) $\frac{13 + 7}{6 - 3}$

(f) $(7 \times 6) + (4 - 3)$

2. (a) $12 - (3 + 5),\ 12 - 8 = 4$

(b) $30 \times 10 \div 5 + 20 = 30 \times 2 + 20$

$= 60 + 20 = 80$

(c) $25 \div 5 + 30 - 35$

$5 + (-5) = 0$

(d) $32 + 96 \div (8 + 4)$

$32 + 96 \div 12$

$= 32 + 8 = 40$

(e) $24 + 33 \div (34 - 23)$

$24 + 33 \div 11$

$= 24 + 3 = 27$

(f) $80 \div (15 + 8 - 3) + 4$

$80 \div (23 - 3) + 4$

$80 \div 20 + 4$

$4 + 4 = 8$

3. (a) $80 + 3 \times 5 + 4$ of $5 - 75 \div 15$

$= 80 + 15 + 20 - 8$

$= 115 - 3 = 112$

(b) $7 + (12 - \{ 8 + 3 - (9$ of $6 + 1 - 13 \times 4)\})$

$7 + (12 - \{8 + 3 - (9 \times 6 + 1 - 52)\})$

$7 + (12 - \{8 + 3 - (54 + 1 - 52)\})$

$7 + (12 - \{8 + 3 - (55 - 52)\})$

$7 + (12 - \{11 - 3\}\}$

$7 + (12 - 8)$

$7 + (4)$

11

(c) $5 + (14 + 5 - \{6(5 + 1 - 4)\})$

$5 + (14 + 5 - \{6(6 - 4)\})$

$5 + (14 + 5 - \{6(2)\})$

$5 + (14 + 5 - 12)$

$5 + (19 - 12)$

$= 5 + 7 = 12$

(d) $100 \times 10 + (400 \div \{100 - (50 - 3 \times 10)\})$

$1000 + (400 \div \{100 - (50 - 30)\})$

$1000 + (400 \div \{100 - 20\})$

$100 + (400 \div 80)$

$= 1000 + 5 = 1005$

(e) $(20 - 2(5 - 4) \times \{3 - (5 - 3)\})$

$(20 - 2(1) \times \{3 - 2\})$

$(20 - 2 \times 1)$

$(20 - 2)$

$= 18$

(f) $45 + 3\{34 - 18 - 14\} \times 3\ (17 + 3 \times 4 - (2 \times 7))$

$45 + 3\ \{34 - 18 - 14\} \times 3\ (17 + 3 \times 4 - 14)$

$45 + 3\ \{34 - 32\} \times 3\ (17 + 3 \times 4 - 14)$

$45 + 3\ \{2\} \times 3\ (17 + 12 - 14)$

$45 + 6 \times 3\ (29 - 14)$

$45 + 6 \times 3 \times 15$

$45 + 270$

$= 315$

Puzzle

Greatest multiple of 3 before 100 = 99

Number ranging from 1 to 100 divisible by 3 $= \frac{99}{3} = 33$ number

Greatest multiple of 11 before 100 = 99

Number ranging from 1 to 100 divisible by 11 $= \frac{99}{11} = 9$

Number between 1 to 11 that are both multiples of 1 and 11: 33, 66 and 99 = 3 number

Total number ranging between 1 to 11 that are both multiples of 3 and 11 are: 9 + 33 – 3

Total number ranging between 1 to 11 that are both not multiples of 3 and 11 = 39

$= 100 - 39 = 61$

Hence, 61 number are not multiples of 3 and 11.

Exercise 3.2

1. (a) 12

$1 \times 12 = 12$

$2 \times 6 = 12$

$\underbrace{3 \times 4}_{\text{Factors}} = 12$

Factors of 12 are 1, 2, 3, 4, 6 and 12.

(b) 25

$1 \times 25 = 25$

$\underbrace{5 \times 5}_{\text{Factors}} = 25$

Factors of 25 are 1, 5 and 25

(c) 16

$1 \times 16 = 16$

$2 \times 8 = 16$

$\underbrace{4 \times 4}_{\text{Factors}} = 16$

Factor of 16 are 1, 2, 4, 8 and 16.

(d) 24

$1 \times 24 = 24$

$2 \times 12 = 24$

$3 \times 8 = 24$

$\underbrace{4 \times 6}_{\text{Factors}} = 24$

Factors of 24 are 1, 2, 3, 4, 6, 8, 12, and 24

(e) 18

$1 \times 18 = 18$

$2 \times 9 = 18$

$\underbrace{3 \times 6}_{\text{Factors}} = 18$

Factors of 18 are 1, 2, 3, 6, 9 and 18

(f) 36

$1 \times 36 = 36$

$2 \times 18 = 36$

$3 \times 12 = 36$

$4 \times 9 = 36$

$\underbrace{6 \times 6}_{\text{Factors}} = 36$

Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18 and 36

(g) 288

$1 \times 288 = 288$

$2 \times 144 = 288$

$3 \times 96 = 288$

$4 \times 72 = 288$

$6 \times 48 = 288$

$8 \times 36 = 288$

$9 \times 32 = 288$

$12 \times 24 = 288$

$\underbrace{16 \times 18}_{\text{Factors}} = 288$

Factors of 288 are: 1, 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 32, 36, 48, 72, 96 144 and 288 are the factors of 288.

(h) 250

$1 \times 250 = 250$

$2 \times 125 = 250$

$5 \times 50 = 250$

$\underbrace{10 \times 25}_{\text{Factors}} = 250$

Factors of 250 are: 1, 2, 5, 10, 25, 50, 125 and 250

(i) 125

$1 \times 125 = 125$

$5 \times 25 = 125$

Factor of 125 are: 1, 5, 25 and 125

(j) 88

$1 \times 88 = 88$

$2 \times 44 = 88$

$4 \times 22 = 88$

$\underbrace{8 \times 11}_{\text{Factors}} = 88$

Factors of 88 are 1, 2, 4, 8, 11, 22, 44 and 88.

(k) 180

$1 \times 180 = 180$

$2 \times 90 = 180$

$3 \times 60 = 180$

$4 \times 45 = 180$

$5 \times 36 = 1800$

$6 \times 30 = 180$

$9 \times 20 = 180$

$10 \times 18 = 180$

$\underbrace{12 \times 15}_{\text{Factors}} = 180$

Factors of 180 are 1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 30, 36, 45, 60, 90 and 180.

2. Multiples of number between = 200 and 300

(a) $55 = 55 \times 3$

$= 165$

(b) $63 = 63 \times 4$

$= 252$

(c) $82 = 82 \times 3$

$= 246$

(d) $91 \times 2 = 182$

(e) $43 \times 5 = 215$, $43 \times 6 = 258$

(f) 25×8

$= 200$

$25 \times 9 = 225$, $25 \times 10 = 250$, $25 \times 11 = 275$, $25 \times 12 = 300$

3. If 2 divides the number exactly (Without leaving any remainder) the number will be the muultiple of 2.

	Number	Division by 2	Remainder if any	Multiples of 2
(a)	72	72 ÷ 2	No	Yes
(b)	79	79 ÷ 2	Yes = 1	No
(c)	896	896 ÷ 2	No	Yes
(d)	6753	6753 ÷ 2	Yes = 1	No
(e)	423	423 ÷ 2	Yes = 1	No
(f)	7162	7162 ÷ 2	N0	Yes

4. If 10 divides number exactly (Without leaving any remainder) then the number will be the multiple of 10.

	Number	Division by 10	Remainder if any	Multiple of 10
(a)	670	670 ÷ 10	No	Yes
(b)	7436	7436 ÷ 10	Yes = 6	No
(c)	1908	1908 ÷ 10	Yes = 6	No
(d)	843900	843900 ÷ 10	No	Yes
(e)	71303	71303 ÷ 10	Yes = 6	No
(f)	40	40 ÷ 10	No	Yes

5. Multiples of number between 55 and 105.

(a) **10**: $10 \times 6 = 60$, $10 \times 7 = 70$, $10 \times 8 = 80$, $10 \times 9 = 90$, $10 \times 10 = 100$

(b) **15**: $15 \times 4 = 60$, $15 \times 5 = 75$, $15 \times 6 = 90$, $15 \times 7 = 105$

(c) **20**: $20 \times 3 = 60$, $20 \times 4 = 80$, $20 \times 5 = 100$

(d) **30**: $30 \times 2 = 60$, $30 \times 3 = 90$

(e) **40**: $40 \times 2 = 80$

Exercise 3.3

1. (a) 1

(b) 2, 3, 5 and 7 = 4

(c) 11, 13, 17 and 19 = 4

(d) Only one that is 2

(e) Because all the other even numbers are multiples of 2

(f) 3, 13, 23, 43, 53, 73 and 83 = 7

(g) Pair of twin primes: (3, 5), (5, 7), (11, 13), (17, 19), (29, 31), (41, 43), (59, 61) and (71, 73)

2. (b) 181, (d) 83, (f) 67, (h) 61, (i) 43, (j) 97, (m) 63 and (p) 131: they do not have any factor other than 1 and number itself.

3. (a) Factors of 52: (1), 2, 4, 13, 26 and 52.

Factors of 81: (1), 3, 9, 27 and 81

Since, both 35 and 39 are composite numbers, the only factor common between them is 1.

Therefore, 35 and 39 are co-prime numbers.

(b) Factors of 294: (1), (2), (4), 61, 122 and 244.

Factors of 256: (1), (2), (4), 8, 16, 32, 64, 128 and 256.

244 and 256 are both composite numbers, but they have common factors except 1.

Therefore, 244 and 256 are not co-prime numbers

(c) 88 and 187

88: Factors of 88: (1), 2, 4, 8, (11), 22, 44 and 88

187: Factors of 187: (1), (11), 17 and 187

Both 88 and 187 are composite numbers but they have common factor other than 1.

Therefore, 88 and 187 are not co-prime numbers.

(d) 675 and 392

Factors of 675: 1, 3, 5, 9, 15, 25, 27, 45, 75, 135, 225 and 675

Factors of 392: 1, 2, 4, 7, 8, 14, 28, 49, 56, 98, 196 and 392.

Since both 675 and 392 are composite numbers, the only factor common between them is therefore, 675 and 391 are co-prime numbers.

Exercise 3.4

1. A number is divisible by 2 if its ones digits are 0, 2, 4, 6, or 8.

	Numbers	Number at ones place	Even number at ones place	Divisble by 2
(a)	6895	5	No	No
(b)	4681	1	No	No
(c)	30032	2	Yes	Yes
(d)	71849	9	No	No
(e)	6000	0	Yes	Yes
(f)	81818	8	Yes	Yes

(g)	6022	2	Yes	Yes
(h)	5818	8	Yes	Yes
(i)	4888	8	Yes	Yes
(j)	14003	3	No	No

2. A number is divisble by 3 if the sum of its digits is divisible by3

	Numbers	**Sum of the digits**	**Is the sum divisible by 3**	**Divisible by 3**
(a)	6581	6 + 5 + 8 + 1 = 20	No	No
(b)	2346	2 + 3 + 4 + 6 = 15	Yes	Yes
(c)	71813	7 + 1 + 8 + 1 + 3 = 20	No	No
(d)	9090	9 + 0 + 9 + 0 = 18	Yes	Yes
(e)	3535	3 + 5 + 3 + 5 = 16	No	No

3. A number is divisible by 4 if the number formed by last 2 digit is divisible by 4.

	Numbers	**Ones and Tens digit**	**Is the sum divisible by 4**	**Divisible by 4**
(a)	6464	64	Yes	Yes
(b)	91912	12	Yes	Yes
(c)	73730	30	No	No
(d)	85917	17	No	No
(e)	81818	18	No	No

4. A number is divisible by 5 if its ones digit is either 5 or 0.

	Numbers	**One digits**	**Ones digits 5 or 0**	**Divisible by 5**
(a)	375	5	Yes	Yes
(b)	25	5	Yes	Yes
(c)	83	3	No	No
(d)	70004	4	No	No
(e)	6105	5	Yes	Yes
(f)	2100	0	Yes	Yes
(g)	8325	5	Yes	Yes
(h)	5005	5	Yes	Yes
(i)	55581	1	No	No
(j)	60007	7	No	No

5. A number is divisible by 7, if the difference between twice the lost digit and number formed by other digits is either 0 or a multiple of 7

	Numbers	**Ones digit**	**Twice of one digit**	**Difference between twice of ones digit and rest of the digit**	**Is difference the multiple of 7**	**Multiple of 7**
(a)	364	4	4 × 2 = 8	36 − 8 = 28	Yes	Yes
(b)	1505	5	5 × 2 = 10	150 − 10 = 140	Yes	Yes
(c)	3192	2	2 × 2 = 12	319 − 4 = 315	Yes	Yes
(d)	4156	6	6 × 2 = 12	415 − 12 = 403	No	No

(e)	3159	9	9 × 2 = 18	315 − 9 = 306	No	No
(f)	7218	8	8 × 2 = 16	721 − 8 = 713	No	No
(g)	7878	8	8 × 2 = 16	787 − 16 = 771	No	No
(h)	6507	7	7 × 2 = 14	650 − 16 = 634	No	No

6. A number is divisible by 6, if the number is divisble by 2 and 3.

	Numbers	**Digit at ones place**	**Even number at ones place**	**Divisible by 2**	**Sum of the digits**	**Is the sum divisible by 3**	**Divisible by 3**	**Divisible by both 2 and 3**	**Divisible by 6**
(a)	6581	1	No	No	6+5+8+1 = 20	No	No	No	No
(b)	2346	6	Yes	Yes	2+3+4+6 = 15	Yes	Yes	Yes	Yes
(c)	71813	3	No	No	7+8+1+3 = 20	No	No	No	No
(d)	9090	0	Yes	Yes	9 + 0 + 9 + 0 = 18	Yes	Yes	Yes	Yes
(e)	3235	5	No	No	3 + 5 + 3 + 5 = 16	No	No	No	No
(f)	8190	0	Yes	Yes	8 + 1 + 9 + 0 = 18	Yes	Yes	Yes	Yes
(g)	1722	2	Yes	Yes	1 + 7 + 2 + 2 = 12	Yes	Yes	Yes	No
(h)	9163	3	No	No	9 + 1 + 6 + 3 = 19	No	No	No	No
(i)	5982	2	Yes	Yes	5+9+8+2 = 24	Yes	Yes	Yes	Yes
(j)	3334	4	Yes	Yes	3+3+3+4 = 13	No	No	No	No
(k)	5034	4	Yes	Yes	5+0+3+4 = 12	Yes	Yes	Yes	Yes
(l)	263	3	No	Yes	2+6+3 = 11	No	No	No	No
(m)	164	4	Yes	Yes	1+6+4 = 11	No	No	No	No
(n)	8135	5	No	No	8+1+3+5 = 17	No	No	No	No
(o)	72362	2	Yes	Yes	7+2+3+6+2 = 20	No	No	No	No

7. A number is divisible by 8, if the number formed by last three digits is divisible by 8.

	Numbers	**Last 3 digit**	**Are last three digits divisible by 8**	**Divisible by 8**
(a)	71712	712	Yes	Yes
(b)	38609	609	No	No
(c)	45320	320	Yes	Yes
(d)	71816	816	Yes	Yes
(e)	965	965	No	No
(f)	29817	817	No	No
(g)	5368	368	Yes	Yes
(h)	6072	072	Yes	Yes
(i)	4568	568	Yes	Yes
(j)	4821	821	No	No

8. A number is divisible by 9, if the sum of its digits is divisible by 9.

	Numbers	Sum of the digits	Is the sum divisible by 9	Divisible by 9
(a)	1819	1 +8+1+9 = 19	No	No
(b)	7236	7+2+3+6=18	Yes	Yes
(c)	45540	4+5+5+4+0=18	Yes	Yes
(d)	36819	3+6+8+1+9 = 27	Yes	Yes
(e)	2425	2+4+2+5 = 13	No	No
(f)	90027	9+0+0+2+7 = 18	Yes	Yes
(g)	6273	6+2+7+3 = 18	Yes	Yes
(h)	8001	8+0+0+1 = 9	Yes	Yes
(i)	4375	4+3+7+5 = 19	No	No
(j)	8931	8+9+3+1 = 21	No	No

9. A number is divisible by 10, if the digit at ones place is 0.

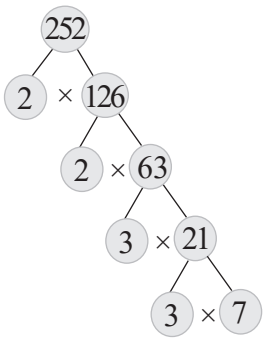
	Numbers	Ones digit	Is ones digit 0	Divisible by 10
(a)	29	9	No	No
(b)	430	0	Yes	Yes
(c)	89	9	No	No
(d)	77	7	No	No
(e)	120	0	Yes	Yes
(f)	33	3	No	No
(g)	17908	8	No	No
(h)	3640	0	Yes	Yes

10. A number is divisible by 11, if the difference between the sum of the digits at ad places and the sum of the digits at even places is 0 are a multiple of 11

	Numbers	Sum of the digits at odd places	Sum of the digits at even places	Difference between them	Is the difference divisible by 11 or 0	Divisible by 11
(a)	71412	7+4+2 = 13	1+1 = 2	13–2 = 11	Yes	Yes
(b)	376277	3+6+7 = 16	7+2+7 = 16	16–16 = 0	Yes	Yes
(c)	6116	6+1 = 7	1+6 = 7	7–7 = 0	Yes	Yes
(d)	86124	8+1+4 = 13	6+2 = 8	13–8 = 5	No	No
(e)	643214	6+3+1 = 10	4+2+4 = 10	10–10 = 0	Yes	Yes
(f)	20438	2+4+8 = 14	0+3 = 3	14–3 = 11	Yes	Yes
(g)	48925	4+9+5 = 18	8+2 = 10	18–10 = 8	No	No
(h)	14909	1+9+9 = 19	4+0 = 4	19–4 = 15	No	No
(i)	97526	9+5+6 = 20	7+2 = 9	20–9 = 11	Yes	Yes
(j)	563761	5+3+6 = 14	6+7+1 = 14	14–14 = 0	Yes	Yes

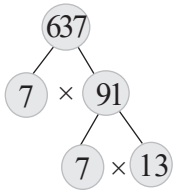
Exercise 3.5

1. (a)



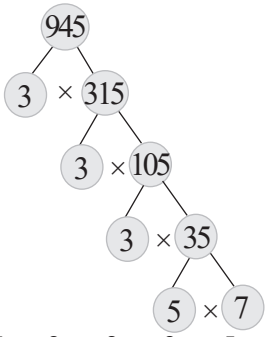
$252 = 2 \times 2 \times 3 \times 3 \times 7$

(b)



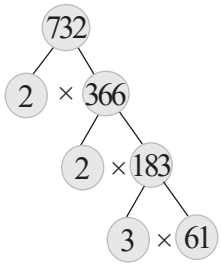
$637 = 7 \times 7 \times 13$

(c)



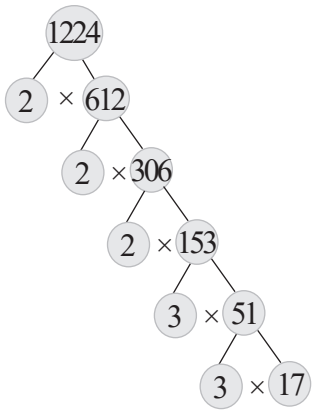
$945 = 3 \times 3 \times 3 \times 5 \times 7$

(d)



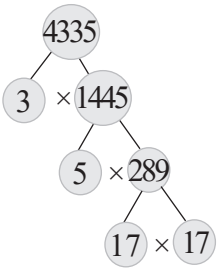
$732 = 2 \times 2 \times 3 \times 61$

(e)



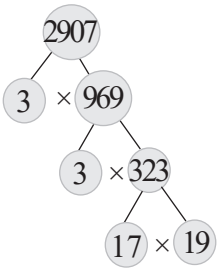
$1224 = 2 \times 2 \times 2 \times 3 \times 3 \times 17$

(f)



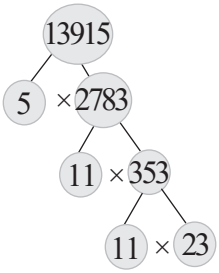
$4335 = 3 \times 5 \times 17 \times 17$

(g)



$2907 = 3 \times 3 \times 17 \times 19$

(h)



$13915 = 5 \times 11 \times 11 \times 23$

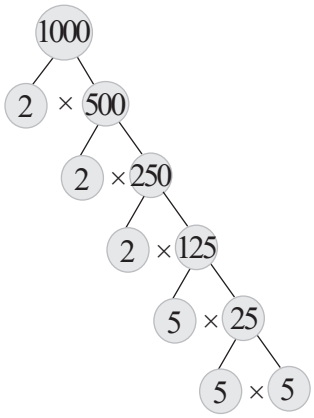
2. (a) $48 = 2 \times 2 \times 3 \times 4$ (It is not in prime factorization as 4 is not a prime factors).

(b) $168 = 7 \times 2 \times 3 \times 2 \times 2$ (It is in prime factorizations as all the factors are prime numbers).

(c) $350 = 2 \times 25 \times 7$ (It is not in prime factoriation as 25 is not a prime factors)

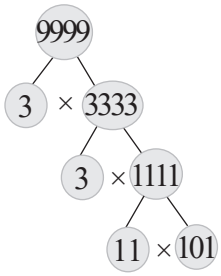
(d) $28 = 2 \times 14$ (It is not in prime factoriation as 14 is not a prime factors)

3. Smallest 4-digit number is 1000.



$1000 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$

4. Largest 4-digit number



$9999 = 3 \times 3 \times 11 \times 101$

5. Factors that are not included in the prime factorization of a composite number are 1 the number itself and other composite numbers.

Exercise 3.6

1. (a) 42, 50

Factors of 42: (1), (2), 3, 6, 7, 14, 21, and 42

Factors of 50: (1), (2), 5, 10, 25 and 50

Common factors: 1 and 2

(b) 24, 72

Factors of 24: (1), (2), (3), (4), (6), (8), (12) and (24)

Factors of 72: (1), (2), (3), (4), (6), (8), 9, (12), 18, (24), 36 and 72.

Common factors: 1, 2, 3, 4, 6, 8, 12, and 24.

(c) 39, 52

Factors of 39: (1), 3, (13) and 39

Factors of 52: (1), 2, 4, (13), 26 and 52

Common factors: 1 and 13

(d) 14, 77

Factors of 14: (1), 2, 7 and 14

Factors of 77: (1), (7) and 11

Common factors: 1 and 7

(e) 345, 125

Factors of 345: (1), 3, (5), 15, 23, 69, 115 and 345

Factor of 125: (1), (5), 25 and 125

Common factors: 1 and 5

(f) 63, 253

Factors of 63: (1), 3, 7, 9, 21, and 63

Factors of 253: (1), 11, 23 and 253

Common factors: 1

(g) 203, 551

Factors of 203: (1), 7, (29) and 203

Factors of 551: (1), 19, (29) and 551

common factors: 1 and 29.

(h) 169, 337

Factors of 169: 1, 13 and 169

Factors of 337: 1, 337

Common factors: 1

2. (a) 42, 56

2	42
3	21
7	7
	1

2	56
2	28
2	14
7	7
	1

$42 = (2) \times 3 \times (7)$ $56 = (2) \times 2 \times 2 \times (7)$

HCF $= 2 \times 7 = 14$

(b) 24, 52

2	24
2	12
2	6
3	3
	1

2	52
2	26
13	13
	1

$24 = (2) \times (2) \times 2 \times 3$, $52 = (2) \times (2) \times 13$

HCF $= 2 \times 2 = 4$

(c) 39, 52

3	39
13	13
	1

2	52
2	26
13	13
	1

$39 = 3 \times (13)$ $52 = 2 \times 2 \times (13)$

HCF = 13

(d) 44, 77

2	44
2	22
11	11
	1

7	77
11	11
	1

$44 = 2 \times 2 \times (11)$ $77 = 7 \times (11)$

HCF = 11

(e) 345, 506

3	345
5	115
23	23
	1

2	506
11	253
23	23
	1

$345 = 3 \times 5 \times \mathbf{23}$

$506 = 2 \times 11 \times \mathbf{23}$

(f) 63, 253

3	63
3	21
7	7
	1

7	253
23	23
	1

$63 = 3 \times 3 \times 7$

$253 = 11 \times 23$

HCF = 1

(g) 203, 551

7	203
29	29
	1

19	551
29	29
	1

$203 = 7 \times (29)$

$551 = 19 \times (29)$

HCF = 29

(h) 169, 377

13	169
13	13
	1

13	377
29	29
	1

$169 = (13) \times 13$

$377 = (13) \times 9$

HCF = 13

3. (a) Factors of 59: (1) and 59

Factors of 97: (1) and (1)

Only common factor 1 so they are co-prime numbers

(b) 161, 192

Factors of 161: (1), 7, 23 and 161

Factors of 192: (1), 2, 3, 4, 6, 12, 16, 24, 32, 48, 64, 96 and 192

Only common factor 1 so they are co-prime numbers

(c) 343, 432

Factors of 343: (1), 7, 49 and 343

Factors of 432: (1), 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 27, 36, 48, 54, 72, 108, 144, 216, 432

Only common factor 1 So they are co-prime numbers

(d) 512, 945

Factors of 512: (1), 2, 4, 8, 16, 32, 64,1 28, 256

Factors of 945: (1), 3, 5, 7, 9, 15, 21, 27, 35, 45, 63, 105, 135, 189, 315 and 945.

Only common factor 1 So they are co-prime numbers

(e) 385, 621

Factors of 385: (1), 5, 7, 11, 35, 55, 77 and 385

Factors of 621: (1), 3, 9, 23, 27, 69, 207, 621

common factor 1 So they are co-prime numbers

(f) 843, 1014

Factors of 843: (1), (3), 281, 843

Factors of 1014: (1), 2, (3), 6, 13, 26, 39, 78, 169, 338, 507, 1014

Common factors are 1 and 3 So they are not co-prime numbers

4. (a) 84, 98

2	84
2	42
3	21
7	7
	1

2	98
7	49
7	7
	1

84: (2) × 2 × 3 × (7)

98: (2) × (7) × 7

Common factor: 2, 7

HCF = 2 × 7 = 14

(b) 170, 238

2	170
5	85
7	17
	1

2	238
7	119
17	17
	1

170: (2) × 5 and (17)

238: (2) × 7 and (17)

Common factors: 2 and 17

HCF = 2 × 17 = 34

(d) 504, 980

2	504
2	252
2	126
3	63
3	21
7	7
	1

2	980
2	490
5	245
7	49
7	7
	1

504: (2) × (2) × 2 × 3 × 3 and 7

980: (2) × (2) × 5 × 7 × 7

Common factors: 2, 2 and 7

HCF = 2 × 2 × 7 = 28

(d) 72, 108, 180

2	72
2	36
2	18
3	9
3	3
	1

2	108
2	54
3	27
3	9
3	3
	1

2	180
2	90
3	45
3	15
5	5
	1

72: (2) × (2) × 2 × (3) × (3)

108: (2) × (2) × (3) × (3) × 3

180: (2) × (2) × (3) × (3) × 5

Common factors: 2 × 2 × 3 × 3

HCF = 36

(e) 84, 120, 128

2	84
2	42
3	21
7	7
	1

2	120
2	60
2	30
3	15
5	5
	1

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

84: (2) × (2) × 3 × 7

120: (2) × (2) × 2 × 3 × 5

128: (2) × (2) × 2 × 2 × 2 × 2 × 2

Common factors: 2, 2

HCF = 2 × 2 = 4

(f) 106, 159, 371

2	106
53	53
	1

3	159
53	53
	1

7	371
53	53
	1

106: 2 × (53)

159: 3 × (53)

37: 7 × (53)

Common factors: 53

HCF = 53

5. (a) 390, 520

2	390, 520
5	195, 260
13	39, 52
	3, 4

HCF = 2 × 5 ×13

= 130

(b) 10549, 13563

7	10549, 13563
137	959, 1233
	7, 9

HCF = 11 × 137

= 1507

(c) 2628, 8541

3	2628, 8541
3	876, 2847
73	292, 949
	4, 13

HCF = 3 × 3 × 73

= 657

(d) 1197, 1311, 627

3	1197, 1311, 627
19	399, 437, 209
	21, 23, 11

HCF = 3 × 19

= 57

(e) 804, 2077, 1881

	804, 2077, 1881

No common factor, hence

HCF = 1

(f) 923, 207, 1349

	923, 203, 1349

No common factor, hence

HCF = 1

Exercise 3.7

1. 252 – 7 = 245, 324 – 9 = 315

3	252, 315
3	84, 105
7	28, 35
	4, 5

HCF = 3 × 3 × 7 = 63

Greatest number that divides 252 and 324 leaving remainder 7 and 9 respectively is 63.

2. 245 – 5 = 240, 1024 – 5 = 1024

2	240, 1024
2	120, 512
2	60, 256
2	30, 128
	15, 64

HCF = 2 × 2 × 2 × 2 = 16

Greatest number that divides 240 and 1024 leaving reaminder 5 is 16.

3. 35 – 8 = 27, 62 – 8 = 54, 85 - 4 = 81

3	27, 54, 81
3	9, 18, 27
3	3, 6, 9
	1, 2, 3

HCF = 3 × 3 × 3 = 27

The greatest number which divides 131, 160 and 233 leaving remainders 8, 8 and 4 respectively is 27.

4. 131 – 7 = 124, 160 – 5 = 155, 223 – 6 = 217

3	124, 155, 217
	4, 5, 7

HCF = 31

The greatest number which divides 124, 155 and 217 Leaving remainder 7, 5 and 6 respectivelty is 31.

5. 264 – 8 = 256, 168 – 8 = 160

2	256, 160
2	128, 80
2	64, 40
2	32, 20
2	16, 10
	8, 5

HCF = 2 × 2 × 2 × 2 × 2

= 32

The greatest number which divides 264 and 168 leaving remainder as 8 is 32.

6. 445 – 4 = 441, 572 – 5 = 567, 699 – 6 = 693

3	441, 567, 693
21	147, 189, 231
	7, 9, 11

HCF = 3 × 21 = 63

The greatest number which divides 441, 567 and 693 leaving remainder 4, 5 and respectivelty is 63.

7. 189 – 9 = 180, 223 – 3 = 2200, 347 – 7 = 340

2	180, 220, 340
2	90, 110, 170
5	45, 55, 85
	9, 11, 17

HCF = 2 × 2 × 5 = 20

The greatest number which divides 180, 220, 340 leaving remainder 9, 3 and 7 respectivelty is 20.

8. 264 – 12 = 252, 336 – 12 = 324

2	252, 324
2	126, 162
3	63, 81
3	21, 27
	7, 9

HCF = 2 × 2 × 3 × 3 = 36

The greatest number which divides 264 and 336 leaving remainder 12 in each case.

9. Number of students in each group repectivelty: 140, 91, 63

HCF of 140, 91, 63: Equal Number of students in each row

= 7

7	140, 91, 63
	20, 13, 9

HCF = 7

Answer: Each row has 7 students.

10. Length or room: 7m 20cm (1m = 100cm), So 7m 20cm = 7 × 100cm + 20cm

= (700 + 20)cm = 720cm

Breadth of room: 5m 20cm (1m = 100cm) 5m 20cm = 5 × 100cm + 20cm = (500 + 20) cm = 520Cm

Greatest length of the side of square tiles = HCF of Length and Breadth of room

= HCF of 720, 520

2	720, 520
2	360, 260
2	180, 130
5	90, 65
	18, 13

HCF = 2 ×2 × 2 × 5 = 40

= 40

Answer: To put exact number of tiles that no tiles has to be cut, the length of square tiles should be 40cm.

11. Number of Apples: 288

Number of Oranges: 624

Maximum number of fruits that can be put in each box: HCF of number of Apples and number of Oranges

HCF of 288 and 624 = 48

2	288, 624
2	144, 312
2	72, 156
2	36, 78
3	18, 39
	6, 13

HCF = 2 × 2 × 2 × 2 × 3

= 48

Answer: Maximum number of fruits that can be put in each box is 48.

12. Number of Indian stamps: 378

Number of foreign stamps: 588

Maximum number of stamps pasted on each page: HCF of number of number of Indian and foreign stamps = HCF of 378 and 588 = 42

2	378, 588
3	189, 294
7	63, 98
	9, 14

HCF = 2 × 3 × 7 = 42

Answer: Each page can have maximum 42 stamps.

13. Length of room: 7m 20cm (1m = 100cm) so, 7m 20cm = (7 × 100 + 20)cm = (700 + 20) cm = 720cm

Breath of room: 5m 60cm (1m = 100cm) So, 5m 60cm = (5 × 100 + 60)cm

= 500 + 60cm = 560cm

Height of room = 4 = (4 × 100)cm = 400cm

Largest length of tape that can be used to measure all three dimensions, the tape being used and exact number of times in each case = HCF of Length, Breadth and Height of the room, HCF of 720cm = 560cm and 400cm

= 80cm

2	720, 560, 400
2	360, 280, 200
2	180, 140, 100
2	90, 70, 50
5	45, 35, 25
	9, 7, 5

HCF = 2 × 2 × 2 × 2 × 5

= 80

Answer: Largest length of tape that can be used to measure all three dimensions, the tape being used and exact number of times in each case is 80cm

14. Number of roses: 72

Number of Dahlia: 27

Number of Marigolds: 54

Maximum number of identical bouquets that can be made if he used all the flowers = HCF of number of Roses, Number of Dahlia and Number of Marigold

= HCF of 72, 27 and 54

= 9

3	72, 27, 54
3	24, 9, 18
	8, 3, 6

Answer: Maximum number of identical bouquets that make if he used all the flower is 9.

15. (a) HCF of any two or more prime number is always 1, as they have no Common Factor except 1.

(b) HCF of 2 consecutive number is 1 as they do not have any common factor except 1.

(c) HCF of 2 Co-prime number is 1 as they don not have any common factor except 1.

(d) HCF of 2 and an even number will be 2 itself as HCF of the even number taken would be 2 and 2 is the higest factor of 2 only.

Exercise 3.8

1. (a) 12, 20

2	12
2	6
3	3
	1

2	20
5	10
5	5
	1

12 = (2) × (2) × 3

20 = (2) × (2) × 5

LCM of 12 and 20

= 2 × 2 × 3 × 5

= 60

(b) 20, 36

2	20
2	10
5	5
	1

2	36
2	18
3	9
3	3
	1

20 = (2) × (2) × 5

36 = (2) × (2) × 3 × 3

LCM = 2 × 2 × 5 × 3 × 3 = 180

(c) 45, 55

3	45
3	15
5	5
	1

5	55
11	11
	1

45 = 3 × 3 × 3 × (5)

55 = (5) × 11

LCM = 5 × 3 × 3 × 11 = 495

(d) 48, 80

2	48
2	24
2	12
3	6
3	3
	1

2	80
2	40
2	20
2	10
5	5
	1

$48 = (2) \times (2) \times (2) \times (2) \times 3$

$80 = (2) \times (2) \times (2) \times (2) \times 5$

LCM $= 2 \times 2 \times 2 \times 2 \times 3 \times 5 = 240$

(e) 27, 60, 72

3	27
3	9
3	3
	1

2	60
2	30
3	15
5	5
	1

2	72
2	36
2	18
3	9
3	3
	1

$27 = 3 \times (3) \times (3)$

$60 = (2) \times (2) \times (3) \times 5$

$72 = (2) \times (2) \times 2 \times (3) \times (3)$

LCM $= 3 \times 3 \times 3 \times 2 \times 5 \times 2 \times 2$

$= 1080$

(f) 36, 54, 63

2	36
2	18
3	9
3	3
	1

2	54
3	27
3	9
3	3
	1

3	63
3	21
7	7
	1

$36 = (2) \times 2 \times (3) \times (3)$

$54 = (2) \times (3) \times (3) \times 3$

$63 = (3) \times (3) \times 7$

LCM $= 2 \times 2 \times 3 \times 3 \times 3 \times 7$

$= 756$

(g) 49, 63, 84

7	49
7	7
	1

3	63
3	21
7	7
	1

2	84
2	42
3	21
7	7
	1

$49 = 7 \times (7)$

$63 = 3 \times (3) \times (7)$

$84 = 2 \times 2 \times (3) \times (7)$

HCM $= 7 \times 7 \times 3 \times 3 \times 2 \times 2$

$= 1764$

(h) 81, 126, 155, 252

3	81
3	27
3	9
3	3
	1

5	155
31	31
	1

3	252
3	84
2	28
2	14
7	7
	1

2	126
3	63
3	21
7	7
	1

$81 = (3) \times (3) \times (3) \times 3$

$155 = 5 \times 31$

$252 = (3) \times (3) \times 2 \times 2 \times (3)$

$126 = (3) \times (3) \times (3) \times (7)$

LCM $= 3 \times 3 \times 3 \times 3 \times 5 \times 31 \times 2 \times 2 \times 7$

$= 351, 540$

2. (a) 42, 63

3	42, 63
3	21, 63
3	7, 21
7	7, 7
	1

LCM $= 2 \times 3 \times 3 \times 7$

$= 126$

(b) 60, 75

3	60, 75
2	20, 25
2	10, 25
5	5, 25
5	1, 5
	1, 1

LCM $= 3 \times 2 \times 2 \times 5 \times 5$

$= 300$

(c) 12, 18, 20

2	12, 18, 20
3	6, 9, 10
5	3, 9, 5
3	1, 3, 1
	1, 1, 1

LCM = 2 × 2 × 3 × 5 × 3

= 180

(d) 36, 60, 72

2	36, 60, 72
2	18, 30, 36
2	9, 15, 18
3	9, 15, 9
3	3, 5, 3
5	1, 5, 1
	1, 1, 1

LCM = 2 × 2 × 2 × 3 × 3 × 5

= 360

(e) 36, 40, 126

2	36, 40, 126
2	18, 20, 63
2	9, 10, 63
3	9, 5, 63
3	3, 5, 21
5	1, 5, 7
7	1, 1, 7
	1, 1, 1

LCM = 2 × 2 × 2 × 3 × 3 × 5 × 7

= 2520

(f) 16, 28, 40, 77

2	16, 28, 40, 77
2	8, 14, 20, 77
2	4, 7, 10, 77
2	2, 7, 5, 77
5	1, 7, 5, 77
7	7, 7, 1, 77
11	1, 1, 1, 11
	1, 1, 1, 1

LCM = 2 × 2 × 2 × 2 × 5 × 7 × 11 = 6160

(g) 28, 36, 45, 60

2	28, 36, 45, 60
2	14, 18, 45, 30
3	7, 9, 45, 15
3	7, 3, 15, 5
5	7, 1, 5, 5
7	7, 1, 1, 1
	1, 1, 1, 1

LCM = 2 × 2 × 3 × 3 × 5 × 7

= 1260

(h) 144, 180, 384

2	144, 180, 384
2	72, 90, 192
2	36, 45, 96
2	18, 45, 48
2	9, 45, 24
2	9, 45, 12
2	9, 45, 6
3	9, 45, 3
3	3, 15, 1
5	1, 5, 1
	1, 1, 1

LCM = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 3 × 3 × 5

= 5760

3. Time in which first school bell rings every time: 40 minutes

Time in which second school bell rings every time: 60 minutes

Time at which both school bells rang together: 8:00 am

LCM of 40 minutes and 60 minutes = Time in which both school bells rings togethers

= 120 minutes ($\therefore$ 1 hour = 60 minutes, 1 minute = $\frac{1}{60}$ hours)

2	40, 60
2	20, 30
2	10, 15
3	5, 15
5	5, 15
	1, 1

120 minutes = $\frac{120}{60}$ hours

= 2 hours

If the bell rang together at 8: 00 am then it will again rang together 2 hours.

8: 00 Am + 2 hours = 10: 00AM.

Answer: Next time both the bell will ring together at 10:00 Am.

4. Let us assume the common factor to the number to box

Since the number whose LCM is given in the ratio of 1:2:3 hence we can write the number to be x, 2x, 3x.

Now find the factor of each number as:

1x = 1 × x

2x = 2 × x

3x = 3 × x

So the LCM of the three numbers will be: LCM(1x, 2x, 3x) = 1 × 2 × 3 × x = 6x

Hence the LCM of numbers 1x, 2x, 3x is 6x.

Also given the LCM of the original numbers is 12, now equate the LCM as

6x = 12x = $\frac{12}{6}$ = 2

Hence the value of x = 2, now find the numbers by putting the value of x in the ratios as:

1x = 1 × 2 = 2

2x = 2 × 2 = 4

3x = 3 × 2 = 6

Hence the numbers whose LCM is 12 are 2, 4, 6

5. Given LCM is 12.

Factors of 12 = 1, 2, 3, 4, 6, 12.

Now the factors whose sum is 10 are 6,4.

The two numbers are 6 and 4 (or) 4 and 6.

6. Lcm of pair is 4 and sum is 6.

Lcm 4 can be made using the number like

Lcm (1, 4) = 4 Sum of (1, 4) = 5

Lcm (2, 4) = 4 Sum of (2, 4) = 6

Lcm (4, 4) = 4 Sum of (4, 4) = 8

So my Answer should be (2, 4).

7. Smallest number which is divisible by 3, 4, 5, 6, 10, 15 = LCM of 3, 4, 5, 6, 10 and 15

2	3, 4, 5, 6, 10, 15
2	3, 2, 5, 3, 5, 15
3	1, 1, 5, 3, 5, 15
5	1, 1, 5, 1, 5, 5
	1, 1, 1, 1, 1, 1,

= 2 × 2 × 3 × 5 = 60

Hence, the required number is 60

8. The least number which when divided by 25, 45 and 60 leaves a remainder 20.

First we will take out the LCM of 25, 45, and 60.

Therefore,

3	25, 45, 60
3	25, 15, 20
2	25, 5, 20
2	25, 5, 10
5	25, 5, 5
5	5, 1, 1
	1, 1, 1

LCM(25, 45, 60)= 3 × 3 × 2 × 2 × 5 × 5

= 900

Now, we get LCM and then we will add 20 to it.

So, the answer is 900 + 20 =920

Hence, The least number which will when divided by 25, 45, 60 leaves a remainder 20 is 920.

9. Least number that is divisble by 30, 50, 60 and 90 = LCM of 30, 50, 60 and 90

= 900

2	30, 50, 60, 90
2	15, 25, 30, 45
2	15, 25, 15, 45
3	5, 25, 3, 15
5	5, 25, 1, 5
5	1, 5, 1, 1
	1, 1, 1, 1

LCM = 2 × 2 × 3 × 3 × 5 × 5

Answer: The least number divisible by 30, 50, 60, 90 is 900.

10. Smallest number which when divided by 18, 12 and 24 leaves remainder 16, 10 and 22 respectively.

The smallest number when divided by 18, 12 and 24 leaving remainder 16, 10 and 22 :-

Subtract the given remainders from the numbers:

18 – 16 = 2, 12 – 10 = 2 and 24 – 22 = 2

Therefore, the required number will be 2 less than the L.C.M. of 18, 12 and 24

Finding L.C.M using prime factorization method

18 = 2 x 3 x 3

12 = 2 x 2 x 3

24 = 2 x 2 x 2 x 3

L.C.M. of 18, 12 and 24 is 2 × 2 × 2 × 3 × 3 = 72

Hence, the required number will be 72 – 2 = 70 which when divided by 18, 12 and 24 leaves remainder 16, 10 and 22 respectively

11. Number of chairs Jeevan tried to arrange: 4, 6, or 10

Number of chairs left: 2

Minimum number of chairs: LCM: of 4, 6, 10 is 60.

2	4, 6, 8
2	2, 3, 4
2	1, 3, 2
3	1, 3, 1
	1, 1, 1

= 2 × 2 × 2 × 3

LCM + Number of chairs left

= 24 + 2

= 26

Answer: Minimum number of chair is 26.

12. Ratish plays badminton every other day while, Ramya plays badminton on every fourth day, So the next time Ramaya will play badmintion (That is 4 days after Monday), Ramya will also there as he plays every other day.

Monday + 4 days = Friday

Answer: Ratish and Ramya will play together again on friday

13. Time duration taken by Arun to complete a full round: 8 minutes

Time duration taken by Shaji to complete a full round: 12 minutes

Time duration taken by Mohit to complete a full round: 16 minutes

They will meet again at the same place = HCF of Time taken by Arun, Shaji and Mohit

LCM of 8, 12 & 16

2	8, 12, 16
2	4, 6, 8
2	2, 3, 4
2	1, 3, 2
3	1, 3, 1
	1, 1, 1

2 × 2 × 2 × 2 × 3 = 48

Answer: Rahul, Rita & Rashmi meet again after 48 minutes.

14. Given the first train completes one round of a circular track in 120 seconds and the second train does so in 180 seconds.

Now both trains move in the opposite direction in order to find time after which they will meet for the first time we need to take LCM(120, 180)

$120 = 2120 = 2 \times 2 \times 2 \times 3 \times 5$

$180 = 2 \times 2 \times 3 \times 3 \times 5$

$\therefore$ LCM (120, 180) = 360 seconds

1 second= $\frac{1}{60}$ minutes so,

360 seconds = $\frac{60}{360}$ minutes

= 6 minutes

Answer: The two trains meet for the first time after 6 mins from where they started

15. Number of Oranges in each packet = 6

Number of Apples in each packet = 10

To get the equal number of Apples and Oranges, we have to find LCM(6, 10).

$6 = 2 \times 3$

$10 = 2 \times 5$

LCM(6,10) = $2 \times 3 \times 5 = 30$

Hence, lali should buy at least 30 apples and 30 oranges.

To find number of packets;

Number of packets of oranges = Number of Oranges/Number of Oranges in each packet

$\frac{30}{6} = 5$

Number of packets of apples = Number of apples/Number of Apples in each packet

$\frac{30}{10} = 3$

Hence, Lali has to buy 5 packets of oranges and 3 packets of apples with at least 30 apples.

16. To find the number closest to 5000 which is divisible by 33, 55 and 25, we first find the L.C.M. of 33, 25 and 55.

LCM of 33, 25 and 55 = 825

3	33, 25, 55
5	11, 25, 55
5	11, 5, 11
11	11, 5, 11
	1, 1, 1

LCM = $3 \times 5 \times 11$

= 825

Now, we divide 5000 by 50 and subtract the remainder from 5000 to get the number which is divisible by 33, 25 and 55.

$$\begin{array}{r} 5 \\ 825\overline{)\,5000} \\ -\,4950 \\ \hline 150 \end{array}$$

If we subtract 50 from 5000, we get 4950 as the result, which is divisible by 33, 25 and 55

17. Time duration in which logo comes: 20 seconds

Time duration in which name appears: 24 seconds

Time duration in which Jewellery shines: 12 seconds

Time in which all the lights will light up together = LCM of time duration of apperance of logo, Name and Jewellery

= LCM of (20, 24, 12)seconds

2	20, 24, 12
2	10, 12, 6
2	5, 6, 3
3	5, 3, 3
5	5, 1, 1
	1, 1, 1

$= 2 \times 2 \times 2 \times 3 \times 5$

= 120 seconds

1 second = $\frac{1}{60}$

So, 120 sec = $\frac{120}{60}$ minutes

= 2 minutes

Answer: All the lights will light up together in 2 minutes.

18. LCM of number of toffees has kept in the packet: 5, 6, 7 and 8

$= 2 \times 2 \times 2 \times 3 \times 5 \times 7 = 840$

When 5 toffees were kept number of toffees left was 3

When 6 to toffees were kept number of toffees left was 4

When 7 toffees were kept number fo toffees left was 5

When 8 toffees wer kept number of toffees left 6

Observe, $5 - 3 = 2$, $6 - 4 = 2$, $7 - 5 = 2$, $8 - 6 = 2$

The minimum number fo tofffes are $840 - 2 = 838$

Puzzle

The cow produces calf every year.

After one year

The cow produced one calf.

Hence number of cows = 1 + 1 = 2

After two years

The cow produced another calf

Number of cows = 2 + 1 = 3

After three years

Another calf is produced.

Number of cows = 3 + 1 = 4

After four years.

In the fourth year the first born cow can produce a cow.

Hence 2 cows are produced in this year.

Number of cows = 4 + 2 = 6

After five years.

In the fifth year the second cow can produce another baby.

Hence 3 will be produced .

This sequence will follow upto 8 years

So : 6 + 3 + 4 + 5 will be the number of cows after 7 years.

= 9 + 4 + 5

= 13 + 5

= 18

Hence 18 cows will be there at the beginning of the 8 th year.

Puzzle

Product of the age of three boys = 210

Sum of their age = 18

Factors of 210

1×210

2×105

3×70

5×42

6×35

7×30

$\underbrace{10 \times 21}_{\text{Factors}} = 25$

By hidden and trial method we get the possible Combination are: 5, 67

$5 \times 6 \times 7 = 210$

$5 + 6 + 7 = 18$

Hence the age of 3 boys are 5, 6, 7 year respectively.

Exercise 3.9

1. 25, 65

Product of Numbers = Product of their HCF & LCM

LCM =

5	25, 65
5	5, 13
13	1, 13
	1, 1

HCF =

5	25, 65
	5, 13

LCM = $5 \times 5 \times 13$ HCF = 5

$= 325$

$25 \times 65 = 325 \times 5$

$1625 = 1625$

(b) 117, 221

Product of numbers = Product of their HCF & LCM

117 × 221 = 1989 × 13

25857 = 25857

LCM =

13	117, 221
3	9, 17
3	3, 17
17	1, 17
	1, 1

HCF =

13	117, 221
	9, 17

LCM = 13 × 3 × 3 × 17 = 1989 HCF = 13

(c) 35, 40

Product of numbers = Product of their HCF & LCM

35 × 40 = 5 × 280

1400 = 1400

LCM =

2	35, 40
2	35, 20
2	35, 10
3	35, 10
5	7, 1
	1, 1

HCF =

5	35, 40
	7, 8

LCM = 2 × 2 × 2 × 5 × 7 = 280 HCF = 5

(d) 87, 145

Product of numbers = Product of their HCF & LCM

87 × 145 = 435 × 29

12615 = 1265

LCM =

2	87, 145
2	29, 145
2	1, 5
	1

HCF =

29	87, 145
	3, 5

LCM = 3 × 29 × 5 = 435 HCF = 29

(e) 490, 1155

Product of numbers = Product of their HCF & LCM

490 × 1155 = 16170 × 35

565950 = 565950

LCM =

2	490, 1155
5	245, 1155
7	49, 231
7	7, 33
33	1, 33
	1, 1

HCF =

5	490, 1155
5	98, 231
	14, 33

LCM = 2 × 5 × 7 × 7 × 3 × 3 = 16170 HCF = 35

(f) 87, 145

Product of numbers = Product of their HCF & LCM

LCM =

3	87, 145
5	29, 145
29	29, 29
	1, 1

HCF =

13	87, 45
	3, 5

LCM = 3 × 5 × 29 = 435 HCF = 29

(g) 186, 403

Product of numbers = Product of their HCF & LCM

186 × 403 = 2418 × 31

74958 = 74958

2	186, 403
13	93, 403
3	93, 31
31	31, 31
	1, 1

31	186, 403
	6, 13

LCM = 2 × 13 × 3 × 31 = 2418 HCF = 31

(h) 490, 1150

Product of numbers = Product of their HCF & LCM

490 × 1150 = 56350 × 10

563500 = 563500

LCM = 3 | 490, 1150 ; 5 | 245, 575 ; 5 | 49, 115 ; 7 | 49, 23 ; 7 | 7, 23 ; 23 | 1, 23 ; | 1, 1

HCF = 2 | 490, 1150 ; 5 | 245, 575 ; | 49, 115

LCM = 2 × 5 × 5 × 7 × 7 = 23 HCF = 10

= 56350

2. (a) 117, 221

Product of numbers = Product of their HCF & LCM

117 × 121 = 1989 × 13

25857 = 25857

LCM = 3 | 117, 221 ; 3 | 39, 221 ; 13 | 13, 221 ; 17 | 1, 17 ; | 1, 1

HCF = 13 | 117, 221 ; | 9, 17

LCM = 3 × 3 × 13 × 17 = 1989 HCF = 13

(b) 234, 572

Product of numbers = Product of their HCF & LCM

234 × 572 = 5148 × 26

133848 = 133848

LCM = 2 | 234, 572 ; 2 | 117, 286 ; 3 | 117, 143 ; 3 | 39, 143 ; 11 | 13, 143 ; 13 | 13, 13 ; | 1, 1

HCF = 2 | 234, 572 ; 13 | 117, 286 ; | 9, 22

LCM = 2 × 2 × 3 × 3 × 13 × 11, HCF = 2 × 13

= 5148 = 26

(c) 145, 232

Product of numbers = Product of their HCF & LCM

145 × 232 = 1160 × 29

33640 = 33640

LCM = 5 | 145, 232 ; 8 | 29, 232 ; 29 | 29, 29 ; | 1, 1

HCF = 29 | 145, 232 ; | 5, 8

LCM = 5 × 8 × 29 HCF = 29

= 1160

(d) 861, 1353

Product of numbers = Product of their HCF & LCM

861 × 1353 = 9471 × 123

1164933 = 1164933

LCM = 3 | 861, 1353 ; 7 | 287, 451 ; 11 | 41, 451 ; 41 | 41, 41 ; | 1, 1

HCF = 41 | 861 1353 ; 3 | 21, 33 ; | 7, 11

LCM = 41 × 11 × 7 × 3 HCF = 41 × 3

= 9471 = 123

(e) 639, 1078

Product of numbers = Product of their HCF & LCM

639 × 1078 = 68842 × 1

688842 = 688842

LCM = 3 | 639, 1078 ; 3 | 213, 1078 ; 2 | 71, 1078 ; 7 | 71, 539 ; 11 | 71, 77 ; 7 | 71, 7 ; 71 | 71, 1 ; | 1, 1

LCM = 2 × 3 × 3 × 7 × 7 × 11 × 71

= 688,842

HCF = No Common factor hence HCF = 1

(f) 490, 1150

$490 \times 1150 = 56350 \times 10$

$563500 = 563500$

LCM =

2	490, 1150
5	245, 575
7	49, 115
5	7, 115
7	7, 23
23	1, 23
	1, 1

HCF =

41	490, 1150
3	245, 575
	49, 115

LCM = $2 \times 5 \times 7 \times 5 \times 7 \times 23$ HCF = 2×5

$= 56350$ $= 10$

(h) 490, 1150

Product of numbers = Product of their HCF & LCM

$490 \times 1150 = 56350 \times 10$

$563500 = 563500$

LCM =

2	490, 1150
5	245, 575
7	49, 115
5	7, 115
7	7, 23
23	1, 23
	1, 1

HCF =

2	490, 1150
5	245, 575
	49, 115

LCM = $2 \times 5 \times 7 \times 5 \times 7 \times 23$ HCF = 2×5

$= 56350$ $= 10$

3. LCM = 180, HCF = 6, First number = 30

Product of numbers = Product of their HCF & LCM

$30 \times$ Second Number $= 180 \times 6$

$30 \times$ Second number $= 1080$

$$\text{Second number} = \frac{1080}{30}$$

Second number = 36

4. HCF = 16, Product = 3072

Product of numbers = Product of their HCF & LCM

$3072 = 16 \times$ LCM

$$\text{LCM} = \frac{3072}{16}$$

LCM = 192

5. HCF = 145, LCM = 2175 , First number = 725

Product of numbers = Product of their HCF & LCM

$725 \times$ Second number $= 145 \times 2175$

$725 \times$ Second number $= 315{,}375$

$$\text{Second number} = \frac{315,375}{725}$$

Second number = 435

6. Product of numbers = 398880, HCF = 144

Product of numbers = Product of their HCF & LCM

HCF × LCM = Product of numbers

$144 \times$ LCM $= 398880$

$$\text{LCM} = \frac{398880}{144}$$

LCM = 2770

Review Exercise

1. $6 \times 20 \div 5 \div 10$

$6 \times 4 - 10 = 0$

$24 - 10 = 14$

2. $37 + 26 \div 2 + 2$ of $25 - 80 \div 2$

$37 + 13 + 2 \times 25 - 40$

$= 50 + 50 - 40 = 100 - 40 = 60$

3. $20 \div (2$ of $3 + 8 - 4) + 7$

$20 \div (2 \times 3 + 8 - 4) + 7$

$20 \div (6 + 8 - 4) + 7$

$20 \div (14 - 4) + 7 = 20 \div 10 + 7$

$= 2 + 7 = 9$

4. $90 + \{10 + 15$ of $3 - (20 + 30 - 45 \div 5)\}$

$90 + \{10 + 45 - (50 - 9)\}$

$90 + \{10 + 45 - 41\}$

$90 + 55 - 41$

$90 + 14$

$= 104$

5. (a) 441 and 228

3	441
3	147
7	49
7	7
	1

2	228
2	114
57	57
	1

$441 = 3 \times 3 \times 7 \times 7$

$228 = 2 \times 2 \times 57$

No, Common factor, therefore

HCF = 1, Hence they are co-prime number.

(b) 91 and 27

7	91
13	13
	1

3	27
3	9
3	3
	1

$91 = 7 \times 13$

$27 = 3 \times 3 \times 7$

No, Common factor, therefore

HCF = 1, Hence they are co-prime number.

(c) 2310 and 2431

2	2310
3	1155
5	385
7	77
11	11
	1

11	2431
13	221
17	17
	1

$2310 = 2 \times 3 \times 5 \times 7 \times (11)$

$2431 = (11) \times 13 \times 17$

HCF = 11

Hence, 2310 and 2431 are not co-prime numbers.

6. Number ending with even numbers are multiples of 2.

	Number	Last digit	Is lasts digit even	Is it multiple of 2
(a)	27	7	No	No
(b)	892	2	Yes	Yes
(c)	6700	0	Yes	Yes
(d)	471	1	No	No

7. (a) A number is divisible by 3 if the sum of its digits is divisible by 3

	Numbers	**Sum of the digits**	**Is the sum divisible by 3**	**Divisible by 3**
(i)	319	3+1+9 = 13	No	No
(ii)	528	5+2+8 = 15	Yes	Yes

(b) A number is divisible by 4 if the number formed by last 2 digits is divisible by 4.

	Numbers	**Last 2 digits**	**Are last 2 digits divisible by 4**	**Divisible by 4**
(i)	343	43	No	No
(ii)	453	53	No	No

(c) A number is divisible by 5 if its ones digit is either 5 or 0.

	Numbers	**Ones digit**	**Is ones digit 0 or 5**	**Divisible by 5**
(i)	6356	6	No	No
(ii)	34515	5	Yes	Yes

8. (a) To be divisible by 6 the number should be divisible by both 2 and 3.

	Num-bers	Ones digit	Is the ones digit even	Divisible by 2	Sum of the digit	Is the sum divisible by 3	Divisible by 3	Divisible by 6
(i)	348	8	Yes	Yes	3 + 4 + 8 = 15	Yes	Yes	Yes
(ii)	294	4	Yes	Yes	2 + 9 + 4 = 15	Yes	Yes	Yes
(iii)	232	2	Yes	Yes	2 + 3 + 2 = 7	No	No	No
(iv)	94	4	Yes	Yes	9 + 4 = 13	No	No	No

(b) A number is divisible by 8, if the number formed by last three digits is divisble by 8.

	Numbers	Last 3 digits	Are last 3 digits divisible by 8	Divisible by 8
(i)	458	458	No	No
(ii)	1472	472	Yes	Yes
(iii)	6132	132	No	No
(iv)	1104	104	Yes	Yes

(c) A number is divisible by 9, if the sum of its digits is divisible by 9.

	Numbers	Sum of the digits	Is the sum divisible by 9	Divisible by 9
(i)	333	3 + 3 + 3 = 9	Yes	Yes
(ii)	90	9 + 0 = 9	Yes	Yes
(iii)	469	4 + 6 + 9 = 19	No	No
(iv)	2149	2 + 1 + 4 + 9 = 16	No	No

(d) A number is divisible by 10, if the digit at ones place is 0.

	Numbers	Ones digit	Is ones digit 0	Divisible by 10.
(i)	31	1	No	No
(ii)	50	0	Yes	Yes
(iii)	1250	0	Yes	Yes
(iv)	505	5	No	No

(e) A number is divisible by 11, if the difference between the sum of the digits at odd places and the sum of the digits at even places is 0 is a mulitple of 11

	Numbers	Sum of the digits at odd places	Sum of the digits at even place	Difference between them	Is the difference 0 or a multiple of 11	Divisible by 11
(i)	121	1 + 1 = 2	2	2 – 2 = 0	Yes	Yes
(ii)	894036	8 + 4 + 3 = 15	9 + 0 + 6 = 15	15 – 15 = 0	Yes	Yes
(iii)	693	6 + 3 = 9	9	9 – 9 = 0	Yes	Yes
(iv)	40982	4 + 9 + 2 = 15	0 + 8 = 8	15 – 8 = 7	No	No

Multiple choice Questions

1. A prime number has only 2 factors that are 1 and the number itself

(d) has exactly 2 factors

2. (b) 2, Since number 1 has only factor and is neither consider a prime number nor a composite number

3.

3	135
3	45
3	15
5	5
	1

Prime factors of 135 = 3 × 3 × 3 × 5

(c) 3, 3, 3, 5

4. A number is divisible by 9, if the sum of its digits is divisible by 9.

	Numbers	Sum of the digits	Is the sum divisible by 9	Divisible by 9
(a)	2,032	2+0+3+2 = 7	No	No
(b)	5,886	5+8+8+6 = 27	Yes	Yes
(c)	3206	3+2+0+6 = 11	No	No
(d)	6,032	6+0+3+2 = 11	No	No

(b) 5886

5. (d) 5,9 as their HCF is 1.

6. (d) 193, as it has no other factors other than 1 and the number itself

7. Largest 3 digits number exacty divisible by 3 is 999.

$$\begin{array}{r} 333 \\ 5\overline{)\,999} \\ -\,9\downarrow \\ \hline 09 \\ -\,9\downarrow \\ \hline 09 \\ -\,9 \\ \hline 00 \end{array}$$

R = 0

(a) 999

8. 10 + 40 ÷ 8 × 2 – 9

= 10 + 5 × 2 – 9 = 10 + 10 – 9

= 20 – 9 = 11

(c) 11

9. (c) more than two factors

10. 243*51, If the sum of the digits of a number is a multiples of 9 then the number is exactly divisible by 9.

243*51 = 2 + 4 + 3 + * + 5 + 1 = 15 + *

To make it exactly divisible by the sum of the digit be (81 nearest multiple of 9 to 15)

15 + * = 18

* = 18 – 15

* = 3, Hence should be 3

(a) 3

11. (b) 1, it has only 1 factors because of it is neither considered as a prime number nor a composite numbers.

12. (a) Twin primes

13. (b) 18, 25 as their HCF is 1.

14. If the sum of the digits of a number is a multiple of 3 then its is exactly divisbile by 3

1*548 = 1 + *5 + 4 + 8 = 18 + * (18 is already a multiple of 3 so there is no need to add any number, hence * can be 0).

= 18 + 0 = 18

1*548 = 10548

(a) 0

15. (a) a + b (Adding any 2 odd numbers will always give an even numbers)

16. (b) Perfect number

17. (c) (3, 5, 7)

18. 97215 * 6, To make a number divisible by 11, the difference of the sum of its odd and even digits should be 0 multiple of 11

(9 + 2 + 5 + 6) – (7 + 1 + *)

22 – (8 + *)

The minimum value of * is 3 to make the number 7215 * 6 divisible by 11.

22 – (8 + 3)

22 – 11 = 1 (Multiple of 11)

(c) 3

19. (d) None of the above

20. (d) 193 (It has only 2 factors; Number 1 and itself)

21. 8 + 4 ÷ 2 × 5 = 8 + 2 × 5 = 8 + 10 = 18

(c) 18

22. 13 – (12 – 6 ÷ 3) = 13 – (12 – 2) = 13 – 10 = 3

(b) 3

23. 100 × 10 = 100 + 2000 ÷ 100 = 100 × 10 –100 + 20 = 1000 – 100 + 20 = 900 + 20 = 920

(b) 920

24. 8 – [28 ÷ {34 – (36 – 18 ÷ 9 + 8)}]

8 – [28 ÷ {34 – (36 – 2 × 8)}] = 8 – (28 ÷ {34 – (36 – 16)}]

= 8 – [28 ÷ {36 – (34 – 20)}] = 8 – [28 ÷ 14] = 8 – [2] = 6

(a) 6

25. 32 – [48 ÷ {36 – (27 – 16 – 9)}]

32 – [48 ÷ {36 – (27 – 25)}) = 32 – (48 ÷ {36 – 2}] =32 – (48 ÷ 34)

$= \frac{32}{1} - \frac{24}{17} = \frac{544 - 24}{17} = \frac{520}{17}$

(b) $\frac{520}{17}$

Challenge

Sum of 2 numbers: 100

Product of 2 numbers: 1771

Factors of 1771

1 × 1771

7 × 253

11 × 161

$\underbrace{23 \times 77}_{\text{Factors}}$

From trial method, we get that the possible combination are 23 and 77

23 + 77 = 100

23 × 77 = 1771

Hence the number are 23 and 77.

Check your Progress

1. Yes, as any number with one's digit as 0, 2, 4, 6 and 8 is and even number.

2. No, as it has more than 2 factors.

3. 3, 5, 7

4. 14 × 1 = 14

14 × 2 = 28

14 × 3 = 42

14, 28 and 42 are the first three multiples of 14.

5. 29, 439, to make a number divisible by 9 its sum of the digits should be divisible by 9

29,439 = 2 + 9 + 4 + 3 + 9

= 27

27 is divisible by 3 hence 29,439 is divisible by 9.

6. Factor of 30

1 × 30

2 × 15

3 × 10

$\underbrace{5 \times 6}_{\text{Factors}}$

Factor of 30 are 1, 2, 3, 5, 6, 10, 15 and 30

7. 97

8. 5 × 12 ÷ 6 – 7

= 5 × 2 – 7

= 10 – 7

= 3

4 Basic Geometrical Ideas

Exercise 4.1

1. (a) A, B, C
(b) $\overleftrightarrow{AB}$, $\overleftrightarrow{BC}$, $\overleftrightarrow{AC}$

2. (a) $\overrightarrow{PQ}$, $\overrightarrow{PR}$, $\overrightarrow{PS}$
(b) ∠QPR, ∠RPS and ∠SPQ

3. (a) Points = P, Q, R
(b) Lines = $\overleftrightarrow{SR}$
(c) Line segement = $\overline{QR}$, $\overline{PQ}$, $\overline{QS}$
(d) Rays = $\overrightarrow{QP}$, $\overrightarrow{QR}$, $\overrightarrow{QS}$
(e) Angles = ∠RQP, ∠SOP

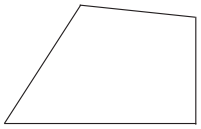
4. (a) Angle
(b) Angle
(c) Line
(d) Ray
(e) Line segment
(f) Ray
(g) Angle
(h) Line
(i) Line segment
(j) Angle

5. (a) 2 line - $\overleftrightarrow{EP}$, $\overleftrightarrow{AB}$
(b) point 0

6. $\overleftrightarrow{L}$, $\overleftrightarrow{AB}$, $\overleftrightarrow{BA}$

7. Rays that make the angle $\overleftrightarrow{QP}$ and $\overleftrightarrow{QR}$, ∠Q, ∠PQR, ∠RQP and ∠3.

8. (a)



(e)

Exercise 4.2

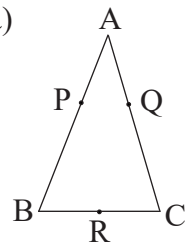
1. (a) ΔPQR (b) ΔXYZ
(c) ΔNMO (d) ΔSTU

2. (a) MO, ON and NM
(b) QP, PR and RQ

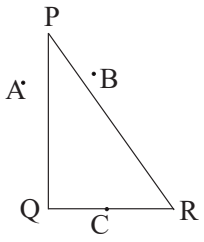
3. (a) ΔABC, ΔABD, ΔADC
(b) ΔABE, ΔAED, ΔADC, ΔABC, ΔABD, ΔAEC
(c) ΔAOB, ΔBOC, ΔCOD, ΔAOD, ΔABD, ΔBDC, ΔABC and ΔADC

4. (a) E and C
(b) A
(d) X, Y and Z
(e) F and D

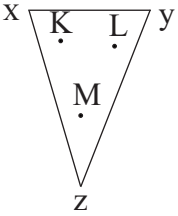
5. (a)



(b)



(c)



6. Side: AB, BC and CA
Angles: ∠A, ∠B and ∠C

7. (a) ∠BDC, ∠CDB and ∠CDE
(b) E
(c) 3; ∠ADB, ∠ADX, ∠BDC
(d) 8; ΔADE, ΔAEB, ΔBEC, ΔCED, ΔADC, ΔABC, ΔADB and ΔBDC

8. (a) AB, BC, CD, DA
(b) ∠A, ∠B, (∠C, ∠D)
(c) ($\overline{AB}$, $\overline{BC}$), ($\overline{BC}$, $\overline{CD}$), ($\overline{CD}$, $\overline{DA}$)
(d) (∠A, ∠B), (∠B, ∠C), (∠C, ∠D), (∠D, ∠A)
(e) ($\overline{AB}$, $\overline{DC}$), (AD, BC)
(f) (∠A, ∠C), (∠B, ∠D)

(g) (AC and BD)

(h) Q and P

(i) x, y

(j) R, S

(k) P, Q, R and S.

9. (a) Adjacent

(b) Opposite

(c) Vertex

(d) Opposite

Exercise 4.3

1. (a) False, A line segment with one end at the centre and the other end on the circle is a radius

(b) True

(c) False, any line segment with one end point at the centre and the other end point on the circle is called radius

(d) False, diameter is the longest chord of the circle

(e) True

(h) True

(i) True

(f) True

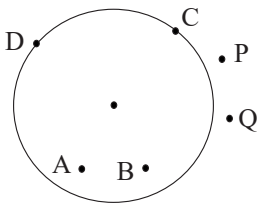
(g) True

2. (a) P, Q

(b) A, B

(c) C, D

(d) A, B, C, D



3. (a) AD, BD

(b) AD, GC

(c) OD, OA

(d) $\overset{\frown}{FED}$, $\overset{\frown}{BAG}$

4. (a) Radius (b) Radius

(c) Chord (d) Arc

(e) Centre

Review Exercise

1. (a) X, Y, Z

(b) $\overline{XZ}$, $\overline{ZY}$, $\overline{XY}$

(c) $\angle x$, $\angle y$, $\angle z$

(d) $\overrightarrow{YX}$, $\overrightarrow{YZ}$, $\overrightarrow{XZ}$

(e) $\overleftrightarrow{XZ}$

2. (a) PS, $\overline{ST}$, $\overline{TU}$, $\overline{UR}$, $\overline{RQ}$, $\overline{QP}$, $\overline{RT}$, $\overline{TQ}$, $\overline{QS}$, $\overline{PS}$, $\overline{RU}$

(b) $\angle SPQ$, $\angle QSP$, $\angle TSQ$, $\angle USQ$, $\angle QTR$, $\angle UTQ$, $\angle UTR$, $\angle STR$, $\angle RQT$, $\angle PQS$, $\angle PQT$, $\angle RQS$, $\angle RUT$, $\angle RUS$, $\angle URQ$, $\angle PRU$, $\angle QRO$ and $\angle SQT$

3. (a) $\angle SRP$ and $\angle PRQ$, $\angle SPR$ and $\angle QPS$

(b) $\angle ABD$ and $\angle CBD$, $\angle ADB$ and $\angle CDB$

4. (a) BC, AB, AC

(b) ΔAOB and ΔBOX

(c) AO, OC and OB (Radii of the same circle)

5. (a) Points (b) Vertex/end point

6. (b)  (e) 

7. (a) Diameter (b) OG (Diameter)

(c) Diameter, bigger (d) Diameter, smaller

Multiple Choice Question

1. (a) Fixed length

2. (c) No length

3. (a) point of concurrence

4. (a) same line

5. (c) a closed curve

7. (a) vertex

8. (b) one vertex two arms

9. (c) four sides

10. (a) lies in its interior

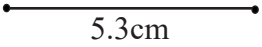
11. (b) two
12. (c) intersecting lines
13. (c) Straight angle
14. (c) line
15. (d) 360°
16. (b) 3
17. (d) trapezium
18. (a) arc

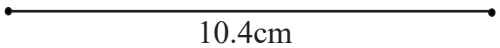
Check Your Progress

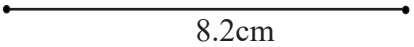
1. 3 line segment: AB, BC and AC
2. $\overrightarrow{AC}$
3. No
4. $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, $\overline{DA}$
5. Triangle has no diagonal
6. yes
7. one
8. No
9. Yes
10. (a) $\overrightarrow{CD}$, $\overrightarrow{AB}$ [Straight lines going in opposite direction that will never meet.
(b) $\overrightarrow{BA}$, $\overrightarrow{DC}$ [Straight lines going upwards that can never meet].

5 Understanding Elementary Shapes

Exercisw 5.1

1. (a) 

(b) 

(c) 

2. (a) P (b) QR

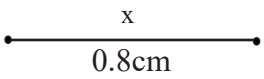
(c) Both are equal

3. (a) 2cm (b) 3.3cm (c) 4.5cm

4. (a) l = 3cm, m = 2.2cm

l – m = (3 – 2.2)cm = 0.8cm

(b) p = 2cm, Q = 2cm



P – Q = (2 – 2)cm = 0cm

5. (a) S = 3.8cm, t = 2.8cm, u = 1.8cm

a(2s – 2t) = ((2 × 3.8cm) – 2 × 2.8cm))

= (7.6cm – 5.6cm) = 2cm

(b) (s + t)

= (3.8 + 2.8)cm

= 6.6cm

(c) (3s – 3u)

= ((3 × 3.8) – (3 × 1.8cm))

= 10.4cm - 5.4cm

= 5cm

6.

	Angle	Type of angle	Measure of the angle
(a)	∠AOE	Acute	60°
(b)	∠COD	Acute	15°
(c)	∠BOK	Obtuse	120°
(d)	∠COI	Right	90°
(e)	∠EOK	Right	90°
(f)	∠EOM	Obtuse	120°
(g)	∠GOM	Right	90°
(h)	∠GOL	Aaute	75°
(i)	∠BOL	Obtuse	150°
(j)	∠COM	Obtuse	150°
(k)	∠BOM	Right	90°
(l)	∠IOM	Acute	60°
(m)	∠DOK	Obtuse	105°
(n)	∠LOE	Obtuse	105°
(o)	∠JOA	Obtuse	135°
(p)	∠MOG	Right	90°

7. (a) (i) right angle

(ii) acute

(iii) obtuse

(iv) right angle

(b) (i) right angle

(ii) right angle

(iii) right angle

(iv) right angle

(c) (i) obtuse

(ii) right angle

(iii) right angle

(iv) obtuse

(d) (i) acute

(ii) obtuse

(iii) right angle

(iv) straight

(v) straight

8. (a) right angle

(b) straight angle

(c) reflex angle

(d) obtuse

(e) acute

(f) obtuse

(g) reflex

(h) reflex

(i) acute

(j) obtuse

(k) obtuse

(l) acute

9. (a) 90°

(b) 0°

(c) 120°

(d) 90°

(e) 60°

(f) 120°

10. (a) $\angle x = 90°$

(b) $\angle x = 60$

(c) $\angle x = 120°$

(d) $\angle x = 60°$, $\angle y = 120°$

(e) $\angle x = 90$, $\angle y = 45$

(f) $\angle x = 60°$, $\angle y = 120°$

Exercise 5.2

1. (a) All sides are different: Scalene triangle

(b) All sides are different: Scalene triangle

(c) All sides are equal: Equilateral triangle

(d) Two sides are equal: Isoscles triangle

(e) All sides are different: Scalence triangle

(f) All sides are different: Scalence triangle

2. (a) Acute angled triangle: All angles less than 90°

(b) Right angled triangle: One angle is 90°

(c) Obtuse angled triangle: One more than 90°

(d) Acute angled triangle: All angles less than 90°

(e) Acute angled triangles: All angles less than 90°

(f) obtuse angled triangle: One angle is more than 90°

3. (a) Sum of median of a triangles is 90°

$50° + \angle x = 90°$

$\angle x = 90° - 50°$

$\angle x = 40°$

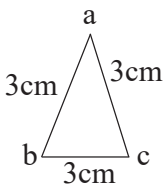
(b) Sum of median of a triangle is 90°

$\angle x + 60° = 90°$

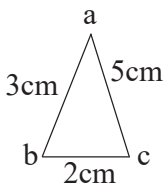
$\angle x = 90° - 60°$

$\angle x = 30°$

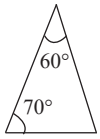
4. (a)



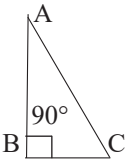
(b)



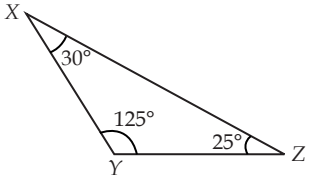
(c)



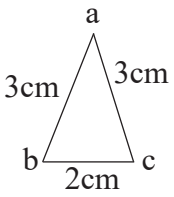
(d)



(e)



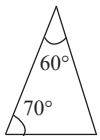
(f)



5. Sum of angles of a tirangle is 180°

Let the missing angle be $\angle x$.

(a)



$60° + 70° + \angle x = 180°$

$\angle x = 180° - 130°$

$\angle x = 50°$

All angles different, hence it is a scalene triangles

(b) $70° + 70 + \angle x = 180°$

$\angle x\ 180° - 140°$

$\angle x = 40°$

Two angles are same hence, it is an isocles triangles

(c) $40° + 40° + \angle x = 180°$

$\angle x = 180° - 80°$

$\angle x = 100$

Two angles are same hence, it is an isoscles Δ.

(d) $30° + 80° + \angle x = 180°$

$\angle x = 180° - 110°$

$\angle x = 70°$

All three angles are different, hence it is a scalene tirangle

(e) $30° + 60° + \angle x = 180°$

$\angle x = 180° - 140°$

$\angle x = 40°$

All three angles are different, hence it is a scalene triangle

(f) $85° + 25° + \angle x = 180°$

$\angle x = 180° = 110°$

$\angle x = 70°$

All three angles are different, hence it is a scalence triangle

Exercise 5.3

1. (a) all four, all four

(b) opposite, all four

(c) 2

(d) right angles 90°

(e) Rhombus or square

2. Kite

3. Since, the quadrilateral is a parallelogram, the opposite sides are equal so, side DA = BC & AB = CD that is 3cm

Another name is quadrilateral

4. In a parallelogram if adjacent sides are equal, then it will be Rhombus If one angle of a Rhombus is 90°, then it will be a square.

Hence, the specific figure is a square

5. (a) Yes, as in a triangle two pairs of adjacent sides are equal

(b) Yes

(c) Yes

(d) Yes, as diagnols of the adjacen sides intersects at 90°

(e) Yes, as diagnols of the adjacen sides intersects at 90°

Exercise 5.4

1. (a) Regular (b) Pentagon

(c) 900° (d) 6

(e) Quadrilateral

2. (d)  is not a polygon as it has no sides.

(e)  is not a polygon as it is a 3-D shaped figure

3. (a) Irregualar Pentagon

(b) Irregular Otagon

(c) Triangle

(d) Irrgular quadrilateral

(e) Regular Hexagon

4. (a) Cylinder

(b) Cuboid

(c) Cuboid

(d) Cyclinder

(e) Pyamid

(f) Sphere

(g) Sphere

(h) Cylinder

5. To be done by students

Puzzle

(a) 8 smaller cubes will have 3 blue faces i.e the corners of the big cube.

(b) 12 smaller cubes have 2 blue faces that are edges of the big cube.

(c) 6 smaller cube have 1 blue face that are in the in centre of the big cube.

(d) 1 smaller cube has 0 blure face that is the cube in the middle of big cube and is full covered by other cubes thus is not colored .

Review Exercise

1. (a) All angles are less than 90° therefore, it is an acute angled Δ.

(b) All sides have different length therefore, it is a scalene triangle.

(c) All sides have same length hence, its an equilateral triangles.

(d) Two sides have same length hence, it is an isoscles triangles.

2. (a) One angles is more than 90°, hence it is an obtuse angle triangle

(b) One angle is 90°. hence, its a right angled triangles.

(c) All angles are less than 90° hence its an acute angled triangle.

(d) One angle is 90°. hence, its a right angled triangle.

(e) One angle is 90°. hence, its a right angled triangles.

(f) One angles is more than 90°, hence it is an obtuse angle triangle.

3. (a) $\angle B + \angle C + \angle D = 180°$

$\angle B + 60° + 60° = 180°$

$\angle B = 60°$

All three angles are same hence, ΔBCD is an equilateral triangles

(b) ΔBCD as all angles are less than 90°

(c) ΔABD as all the sides have different lengths

(d) $\angle ABC$ as $\angle B = 90°$

(e) $\angle AOB + \angle BDC = 180°$ (Linear pair)

$= \angle AOB + 60° = 180°$

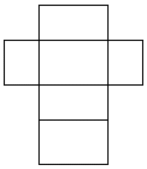
$\angle AOB = 180° - 60°$

$\angle AOB = 120°$

ΔABD is and obtuse angled Δ as one of its angle of its angle is more than 90° or ΔBCE.

(f) ΔBCE as its 2 sides are equal.

4.



5. Trapezium

Multiple Choice Question

1. **Answer:** (c) 5

2. When the clock moves from 2 to 11 it cover 9 out of 12 hours

So, fraction covered $= \frac{9}{12} = \frac{3}{4}$

Answer: (b) $\frac{3}{4}$

3. West to south means turning 45, that is $\frac{1}{4}$th of the rotation.

Answer: (b) $\frac{1}{4}$

4. **Answer:** (d) radius

$= \frac{1}{2}$ diameter

5. **Answer:** (b) The measure of an obtuse angle is less than 90°

6. **Answer:** (c) Straight angle

7. The angle is formed by initial and final position of a ray coincide without making any revolution. Thus measures zero degrees and is called zero angle.

Answer: (a) Zero angle

8. (a) an acute angle Between 0° and 90°

9. (b) an equilateral triangle

10. (b) an isoscles triangle

11. (b) obtuse angle

12. (a) 90°

13. (b) Acute triangle

14. (a) Square

15. (d) 5 faces

16. (b) cube

17. (d) none of these as ice-cream is an example of cone.

18. (d) all of the above

19. (c) no two sides equal

20. (d) cylinder

21. (a) ◯ as it has no sides

22. Number of vertices: 6

Number of Angles: 6

Number of Angles + Number of vertices = 6 + 6 = 12

Answer: (a) 12

23. (c) 3

Challenge

$\angle PQR = \angle QPR + \angle QRS$

Check Your Progress

1. (a) $\angle AOB = 35°$

$35° < 90°$, Hence its an acute angle

(b) $\angle DOC$ is greater than 90°, hence its an obtuse angled triangle.

(c) $\angle POQ$ is 90°. Hence, it is a right angled triangle.

2. **Answer:** 360°

3. $\frac{1}{4}$ of a revolution

$= \frac{1}{4}$ of 60 minutes

= 15 minutes

4. Protactor

5. More than 90°, less than 180°

6. It is false as only 2 sides of an isoscles Δ are equal.

7. Collinear means lying on the same line. Hence, if three points are collinear, they lie on the same line and therefore, formation of triangle is not possible.

8. No

9. Octagon

10. 12

6 Integers

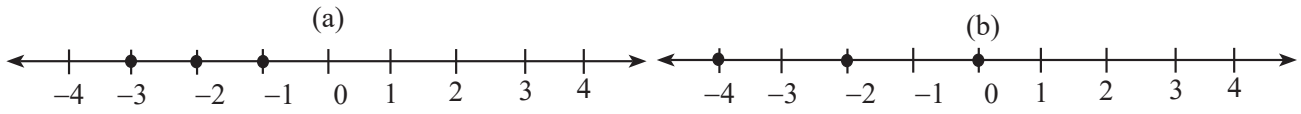
Exercise 6.1

1. (a) –60 (b) +102
(c) –72 (d) +40
(e) Below 0° = Negative, hence –30°
(f) Below 0° Negative hence, –40°
(g) +20 (h) +29
(i) +39 (j) –82
(k) +500 (l) –100
(m) + 30
(n) Below 0° Negative hence, –40°
(o) –10 (p) +80

2. (a) 0 > –4: On the number line –4 is on the left side of 0, hence, 0 is greater than –4
(b) –5 < 2: On the number line 2 is on the right side of 0 and –5 is on the left side of 0, hence +2 is greater than –5
(c) –8 < –6 : On the number line –8 is on the left side of –6 hence –6 is greater than –8.
(d) 0 < 4 : On the number line 4 is on the right side of 0, hence 4 is greater than 0.
(e) 1 > 0 : On the number line 1 is on the right side of 0, hence 1 is greater than 0.
(f) –9 = –9 : On the number line –9 and –9 lies on the same point hence, they both are equal.

3. (a) –4, –1 and 2
(b) –4, –1 and 2
(c) –50, –30, 0 and 10

4.



5. (a) 40° C
(b) –10° C
(c) 30° C

6. (a) –2, –1 (b) –4
(c) –2, –1, 0, 1, 2 (d) 5, 6, and 7
(e) 1, 2, 3 and 4 (f) –4, –3, –2, 1, 0 and 1

7. (a) –3, –4 : On the number line –3 lies on the right side of –4, hence –3 is greater than –4.

(b) –8, –12 : On the number line –8 lies on the right side of –12, hence –8 is greater than –12.

(c) –7, 0 : On the number line 0 lies on the right side of –7, hence 0 is greater than –7

8. (a) –6, 0, –7, 3, –10, 4
–10 is the smallest interger
Next one is –7
Next one is –6
Next one is 0
Next one is 3
Last one is 4
So, the numbers in ascending order are –10, –7, –6, 0, 3 and 4

(b) 3, 6, –3, 0, –8, 1
–8 is the Smallest integer
Next one is –3
Next one is 0
Next one is 1
Next one is 3
Next one is 6
So, the numbers in ascending order are –8, –3, 0, 1, 3 and 6.

9. (a) 6, 3, 0, –3, –6, –9, –12, –15 (Decreasing by 3 or –3)

(b) 16, –8, 0, +8, +16, +24 +24, +32 (Increasing by 8 or +8)

(c) 17, 12, 7, 2, –3, –8, –13 (Decresing by 5 or –5)

10. (a) –10 is one the extreme left, hence it is the smallest number –8 is on the left side of 7 and right side of 10, hence it is greater than -10 and smaller than 7.

7 is on the left side of 9, hence 9 is bigger than 7.

Therefore, –10, –8, 7, 9

(b) -3 is one the left side of –2, which means it is smaller than –2

–2 is on the left side of 0, which means it is smaller than 0.

0 is on the left side by 4, which means it is smaller than 4.

Therefore, –3, –2, 0, 4

(c) –5 is on the left side of -4 which means –5 is smaller than -4.

–4 is one the left side of 4, which means –4 is smaller than 4.

4 is one the left side of 5, which means 4 is smaller than 5.

Therefore, –5, –4, 4, 5

11. Absoloute Value of an integer is always positive

(a) |–60| = 60 (b) |38| = 38

(c) |–40| = 40 (d) |101| = 101

(e) |–31| = 3

12. (a) -29 + 29 = 0 [So, the exact opp. of -29 is 29]

(b) –103 + 103 = 0 [So, the exact opposite of -103 is 103]

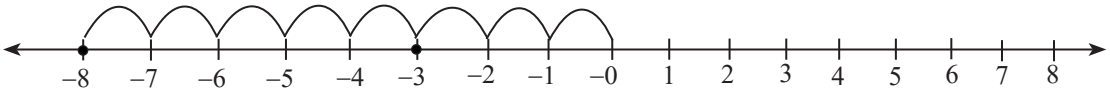
(c) 64 - 64 = 0 [So, the exact opposite of 64 is -64]

(d) –2 + 2 = 0 [So, the exact opposite of –2 is 2]

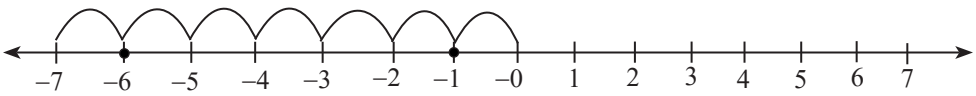
(e) –18 + 18 = 0 [So, the exact opposite of –18 is 18]

Exercise 6.2

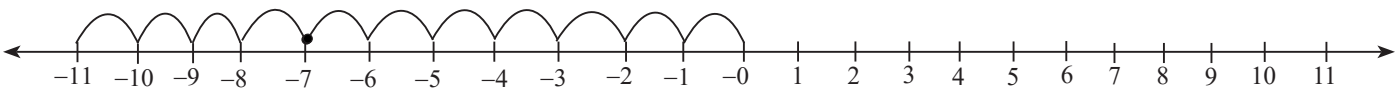
1. (a) (–3) + (–5) = –8



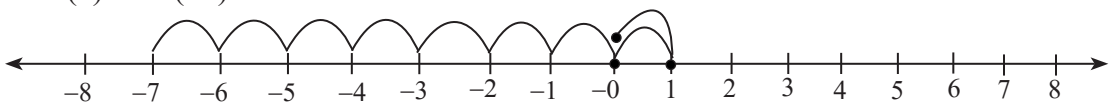
(b) (–6) + (–1) = –7



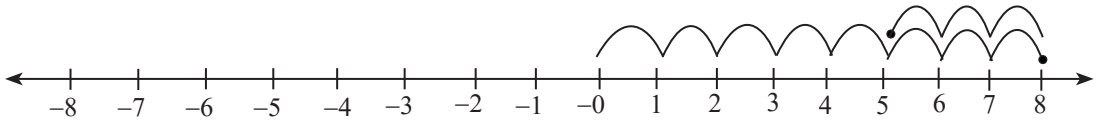
(c) (–4) + (–7) = –11



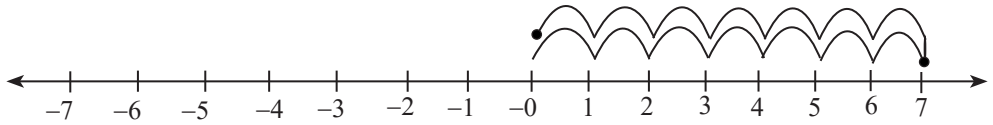
(d) 1 + (–8) = –7



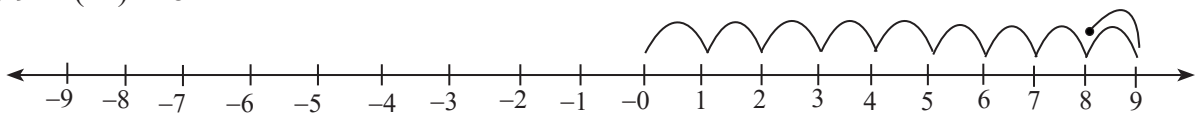
(e) 8 + (–3) = 5



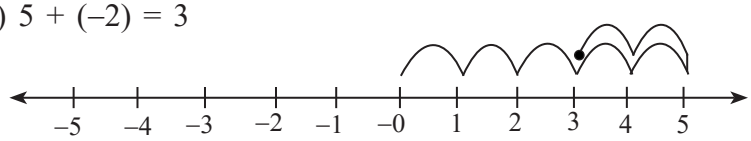
(f) 7 + (–7) = 0



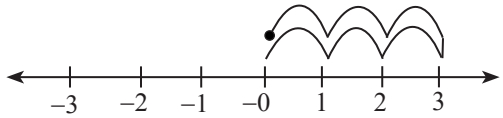
(g) 9 + (–1) = 8



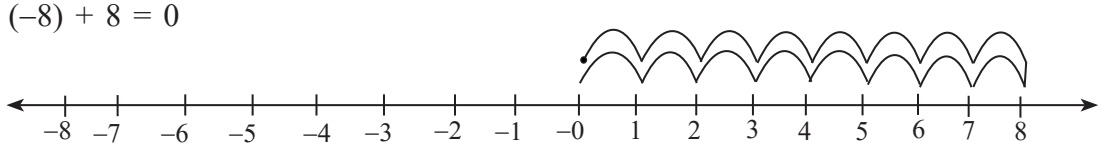
(h) 5 + (–2) = 3



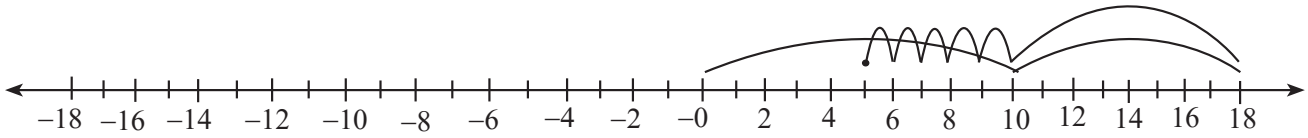
(i) (–3) + 3 = 0



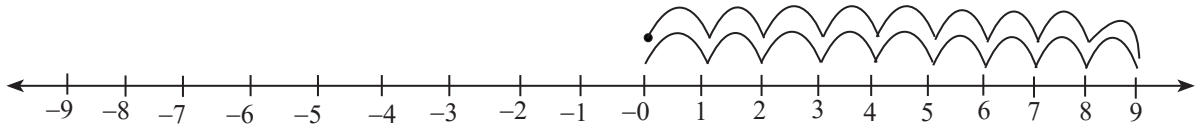
(j) (–8) + 8 = 0



(k)



(l) 9 + (–9) = 0



2. (a) –7 + (–8) –7 – 8 = –15

(b) –3 + (–1) = –3 – 1 = –4

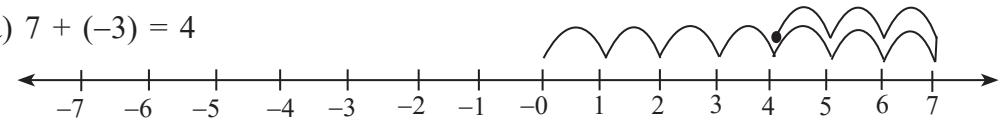
(c) –4 + (+5) = –4 + 5 = 1

(d) –6 +(–7) – 6 – 7 = 13

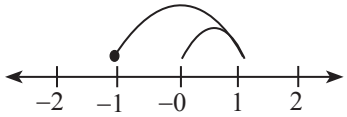
(e) –2 + (–2) = –2 – 2 = –4

(f) 7 + 6 = 13

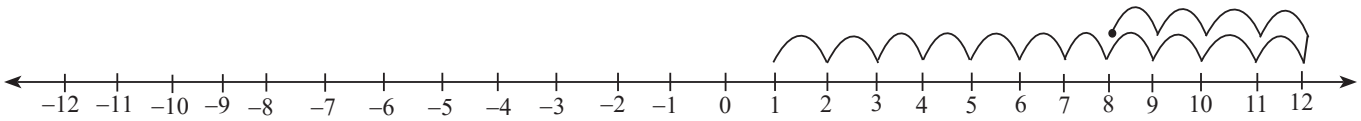
3. (a) 7 + (–3) = 4



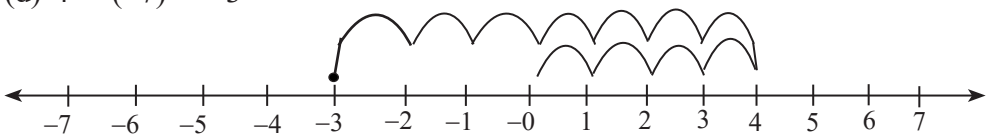
(b) 1 – (+2) = –1



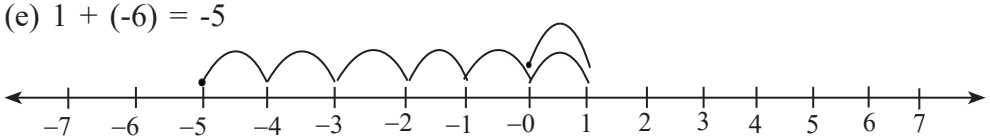
(c) 12 + (–4) = 8



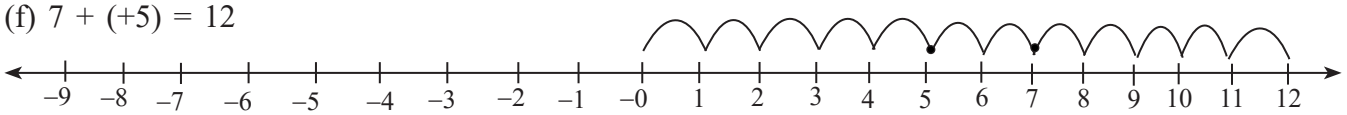
(d) 4 + (–7) = –3



(e) 1 + (-6) = -5



(f) 7 + (+5) = 12



4. (a) (–20) + (+30)

–20 + 30 = 10

(b) (+10) + (–12)

10 – 12 = –2

(c) (+8) + (–20)

8 – 20 = –12

(d) (–7) + (–3)

–7 – 3 = –10

5. (a) 343 + 356 – 343

= 343 – 343 + 356

= 0 + 356 = 356

(b) –726 + 789 + 729 + (–236) (Adding intgers with same sign)

–962 + 1518

= 556

(c) 293 + (–293)

= 293 – 293 = 0

(d) 835 + (–336) + (–264)

835 – 336 – 264 (Adding the negatives)

835 – 600 = 235

(e) 704 + (–4) + (–10) + 10 (–100) (Adding intgers with same sign)

704 – 4 – 10 + 10 – 100

714 – 114

= 600

6. (a) (+8) > (+4) : Both are positive integers and 8 is greater than 4

(b) (+9) < (+11) : Both are positive integers and 11 is greater than 9

(c) (+16) > (+11) : Both are positive integers and 16 is greater than 11

(d) (+10) > (–4) : (+10) is greater than (–4) as 10 lies on the right of zero and (–4) lies on the left side of zero.

(e) (+13) > (–16) : +13 lies on the right side of zero whereas –16 lies on the left side of zero, so +13 is greater than -16.

(f) (+8) > (–21) : + 8 lies on the right side of zero whereas –21 lies on the left side of zero, so +8 is greater than –21.

(g) –4< +4 : +4 Lies on the right side of Zero whereas –4 lies on the left side of zero, so +4 is greater than –4.

(h) –9 < +3 : +3 Lies on the right side of zero wheras –9 lies on the left side or zero, so +3 is greter than –9.

7. 70 – (–60) + (–130)

= 70 + 60 – 130 (Additive inverse of –60 is +60)

= 130 – 130

= 0

8. (–68 + 40) + (15 – (–6)2)

–28 + (15 + 6) (Additivie inverse of –6 is 6)

–28 + 21

= –7

9. The height of lighthouse measured from sea level = 60m

The depth of the seabed measured from sea level = 30m

(The height of lighthouse from seabed) = Height of lighthouse + Depth of seabed

= 60m + 30m

= 90m

Answer: The height of lighthouse from seabed is 90m

Exercise 6.3

1. (a) –(–6) (The additive invese of –6 is 6)

= 6

(b) –(–102) (The additive invese of -102 is 102)

= 102

(c) –(–5) (The additive invese of –5 is 5)

= 5

(d) –(–73) (The additive invese of –73 is 73)

= 73

2. (a) 8 – (–3) (The additive invese of –3 is 3)

8 + 3 = 11

(b) 11 – (–2) (The additive invese of –2 is 2)

11 + 2 = 13

(c) 9–(–9) (The additive invese of –9 is 9)

= 9 + 9 = 18

(d) 15 – (–8) (The additive invese of –8 is 8)

15 + 8 = 23

(e) (–8) – (–2)

– 8 + 2 = –6

(f) (–7) – (–9)

= –7 + 9 = 2

3. (a) (–3) + 3

= –3 + 3 = 0

(b) 17 – 8

= 9

(c) 0 – (–14) (The additive invese of -14 is 14)

0 + 14 = 14

(d) –3 –(–8 + 9) (The additive invese of -8 and 9 is 8 and –9 respectively)

= –3 + 8 – 9

= –12 + 8 = –4

(e) (–1) – (–13) (The additive invese of 13 is 13)

–1 + 13 = 12

(f) 5 – (–1 – 8) (The additive invese of –1 and –8 is 1 and 8)

5 + 1 + 8 = 14

4. (a) –40 –(+25) (The additive invese of 25 is –25)

–40 –25 = –65

(b) –73 –(–73) (The additive invese of –73 is 73)

–73 + 73 = 0

(c) 760 – (–715) (The additive invese of –715 is 715)

760 + 715 = 1475

(d) –70 – 0

= –70

(e) 0 – (–85) (The additive invese of –85 is 85)

= 0 + 85 = 85

(f) 0 – (–185) (The additive invese of –185 is 185)

= 0 + 185 = 185

5. (a) (–8) – (+4) (The additive invese of +4 is –4)

–8 –4 = –12

(b) (–13) – (+15) (The additive invese of +15 is –15

–13 –15 = –28

(c) (–13) – (–8) (The additive invese of –8 is 8)

–13 + 8 = –5

(d) (–5) – (–5) (The additive invese of –5 is 5)

–5 + 5 = 0

(e) (–8) – (–9) (The additive invese of –9 is 9)

–8 + 9 = 1

(f) (–6) – (+ 4) (The additive invese of +4 is –4)

–6 –4 = –10

6. 50 – (28 + (–12))

50 – (28 – 12) (The additive invese of 28 and –12 is -28 and 12 respectively)

= 50 – 28 + 12

= 50 + 12 – 28 = 62 – 28 = 34

Review Exercise

1. (a) –6 > –8 : –6 lies on the right side of –8 hence -6 is greater than –8.

(b) –9 < +9 : –9 lies on the left side of 0, whereas 9 lies on the right side of 10 that proves 9 is greater than –9.

(c) 7 > –8 : –8 lies on the left side of 0, whereas 7 lies on the right side of 0 that proves 7 is greater than –8.

(d) 0 > –4 : 0 lies on the right side of –4 which proves 0 is greater than –4.

(e) –21 < –20 : –20 lies on the right side of –21, hence -20 is greater than –21

(f) (–10) < +13 : –10 lies on the left side of 0, Whereas +13 lies on the right side of 0, that proves +13 is greater than –10.

(g) (–4) < (-3) :–4 lies on the left side of –3, hence –3 is greater than –4.

(h) (–15) > (–18) : –1 lies on the left side of –15, hence –15 is greater than –18.

(i) (–7) < (–6) : –7 lies on the left side of –6, hence –6 is greater than –7.

2. (a) 20, –20, –10, 10, 1, –1, –13

–20 is the smallest integer

Next one is –13

Next ones is –10

Next ones is –1

Next ones is 1

Next ones is 10

Last one is 20

So, the number in ascending order are –20, –13, –10, –1, 1, 10 and 20

(b) 21, 6, –7, 2, 0, –1, –12

–21 is the smallest integer

Next one is –12

Next one is –7

Next one is –1

Next one is 0

Next one is 2

Last one is 6

So, the number in ascending order are –21, –12, –7, –1, 0, 2 and 6.

3. (a) –68, –69: –68 lies on the right side of –69, hence –68 is greater than 69

(b) –372, –433 : –372 lies on the right side of –433, hence –372 is greatet than –433.

(c) 2, –732: 2 lies on the right side of –732, hence 2 is greater than –732.

4. Absoloute Value of an integer is always positive

(a) |7| = 7 (b) |–8| = 8

(c) |–1001| = 1001 (d) |1001| = 1001

5. (a) +8 + (–8) = 0, So the opposite of +8 is –8

(b) –74 + 74 = 0, So the opposite of –74 is 74

(c) –102 + 102 = 0, So the opposite of –102 is 102

(d) +113 + (–113) = 0, So the opposite of 113 is –113

6. (a) (–4) = 4 (The additive inverse of –4 is 4)

(b) –(–17) = 17 (The additive inverse of –17 is 17)

(c) –(–18) = 18 (The additive inverse of –18 is 18)

(d) –(–101) (The additive inverse –101 is 101)

(e) 8 – (–2) (The additive inverse –2 is 2)

= 8 + 2 = 10

(f) 6 – 9

6 + (–9) = –3

7. (a) (+3) + (+35)

= 3 + 35 = 38

(b) (+7) + (+9)

7 + 9 = 16

(c) (+9) + (–3)

9 – 3 = 6

8. (a) (+8) – (+3) (The additive inverse of +3 is –3)

8 – 3 = 5

(b) (+12) – (+5) (The additive inverse of +5 is –5)

12 – 5 = 7

(c) (+20) – (+30) (The additive inverse of -30 is 30)

20 – 30 = –10

(d) (+7) – (+14) (The additive inverse of +14 is –14)

7 – 14 = –7

(e) (+7) – (–3) (The additive inverse of –3 is 3)

7 + 3 = 10

(f) (+4) – (–8) (The additive inverse of –8 is 8)

4 + 8 = 12

Multiple Choice Question

1. Greatest negative integer = –1, Smallest positive integer = 1

(–1) + 1 = 0

(a) 0

2. Distance of one place above sea level = 100m

Distance of other place below sea level = 50m

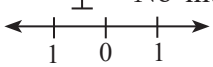
Distance between both the place = 100m + 50m

= 150m

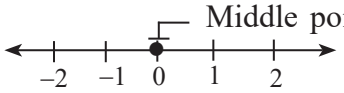
(c) 150m

3. Greatest negative integer = –1

No integer between 0 and –1



(d) none

4. 

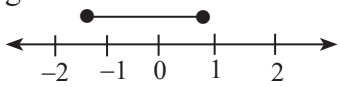
(c) 0

5. (a) not be an integer

6. (b) the left

7. (d) none of these

8. Integers between –2 and 2 are –1, 0 and 1



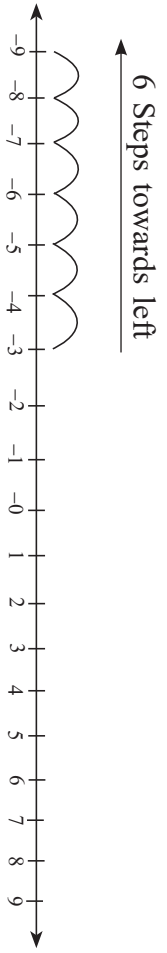
(a) –1, 0 and 1

9. (b) both 1 and 11 are true, as 1 is the smallest positive integer and greates positive integer is infinte

10. (b) Negative (The sum of any 2 negative integers is always negative)

11. (b) X + y = negative (The sum of any 2 negative integers is always negative)

12.



(b) 6 steps to the left of –3

13. The opposite of raise is fall (c) fall in temp by 2° c

14.

= 1 is on the right of other a number, hence it is the greater number between -18 and 2 (b) 1

15. Withdraw is –ve as money is taken so, integer used to represent a withdraw of ₹100 is –₹100 (b) –₹100

16. (a) –1, –1 lies on tathe right on every other -ve int. so, it is the greatest -ve int.

17. –5 + (4) = –5 + 4 = –1 (c) –1

18. (a) always +ve

19. To get the number that should be added to –135 to get –142, we must subtract –135 from 142.

–142 – (–135) = –142 + 135 (Additive inverse of –135 is 135)

= –7

Answer: (c) -7

20. (b) 0 as every –ve int. lies on the left side of 0.

21. –25 –|8 – 12| (Additive inverse of 8 and –12 is –8 and 12 respectively

–25 – 8 + 12

= –33 + 12

= –21

(b) –21

Challenge

(–4) × (–3) = –4 – (–(–3) + (–2)

= –4 – (3) – 2 = (Additive inverse of –3 is 3)

= –4 – 3 – 2 = –9 (Additive inversse of 3 is –3)

Check your Progress

1. Opposite of south is north so, opposite of 15km to the south will be 15km to the north.

2. –21, –22, –23 and –24

3. 12 + |–6| = 12 + (+6) (Absolute Valure of –6 is +6)

= 12 + 6 = 18

4. –125 + 125 = 0 (opposite of -125 is 125)

5. –45 + 30 = –15

6. –40 – (–15) (Additive inverse of -15 is 15)

–40 + 15 = –25

7. 56 > –65 (56 lies on the right side of 0 whereas –65 lies on the left side 0, hence 56 > –65)

8. Greatest negative integer = –1, Smallest positive integer = 1

(–1) + 1 = 0

9. 0, as negative 0 is 0 itself

10. In order to get the number that should be added to –35 to get 35, we must subtract –35 from 35.

35 (–35)

= 35 + 35 (Additive inverse of –35 is 35)

= 70

Answer: 70 should be added to –35 to get 35.

7 Fractions

Exercise 7.1

1. (a) Total protions = 2

Shaded portions = 1

Fraction of shaded portions = $\frac{1}{2}$

(b) Total protions = 4

Shaded portions = 3

Fraction of shaded portions = $\frac{3}{4}$

(c) Total protions = 25

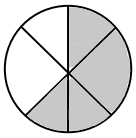
Shaded portions = 5

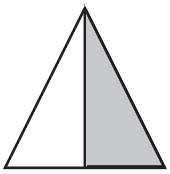
Fraction of shaded portions = $\frac{5}{25}$

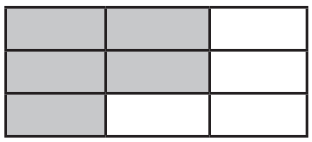
(d) Total protions = 8

Shaded portions = 3

Fraction of shaded portions = $\frac{3}{8}$

2. (a)  = $\frac{4}{6}$

(b)  = $\frac{1}{2}$

(c)  = $\frac{5}{9}$

(d)  = $\frac{3}{8}$

3. (a) Total circles: 8

Shaded circles: 4

Fraction of Shaded circles: $\frac{4}{8}$

(b) Total circles: 10

Shaded circles: 4

Fraction of Shaded circles: $\frac{4}{10}$

4. (a) $\frac{2}{9}$ (b) $\frac{6}{10}$

(c) $\frac{2974}{16}$ (d) $\frac{4}{13}$

(e) $\frac{243}{18}$

(Dividend is the numerator and Divisor is the denominator)

5. (a) 14 ÷ 7 (b) 121 ÷ 11

(c) 52 ÷ 26 (d) 29 ÷ 31

(e) 9 ÷ 4

(Numerator is the dividend and Denominator is the divisor)

6. 1 hour = 60 minutes

Fraction of 30 minutes = $\frac{30}{60} = \frac{1}{2}$

Hence, 30 minutes $\frac{1}{2}$ part of an hour

7. Total hours in a day: 24 hours

5 hours of a day: $\frac{5}{24}$

Hence 5 hours is $\frac{5}{24}$ part of a day.

8. Natural Numbers from 2 to 15: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15

Even numbers from 2 to 15: 2, 4, 6, 8, 10, 12 and 14

= 7

Fraction of even number from 2 to 15:

$$\frac{\text{Number of even numbers}}{\text{Total Number}}$$

$= \frac{7}{14} = \frac{1}{2}$

Hence, $\frac{1}{2}$ part of 2 to 15 natural numbers are even.

9. Total number of Toffes: 66

Part of Toffee given to Kavi = $\frac{5}{11}$

Number of toffees given to Kavi = $\frac{5}{11}$ of 66

$\frac{5}{11}$ is 5 part of 11

1 Part of 11 = $\frac{1}{11}$ of 66 (We have divide 66 by 11 to find part of 11

= 66 ÷ 11 = 6

For $\frac{5}{11}$, We have 6 × 5

= 30

Therefore, 30 toffes were given to Kavi

Number of toffees left with kamal: Total toffees – Number of toffes given to Kavi

$= 66 - 30$

$= 36$

Hence, 36 toffes are left with kamal.

Exercise 7.2

1. (a) $7\frac{4}{3} = \frac{3 \times 7 + 4}{3} = \frac{21 + 4}{3} = \frac{25}{3}$

(b) $11\frac{3}{9} = \frac{9 \times 11 + 3}{9} = \frac{99 + 3}{9} = \frac{102}{9}$

(c) $27\frac{6}{9} = \frac{9 \times 27 + 6}{9} = \frac{243 + 6}{9} = \frac{249}{9}$

(d) $12\frac{8}{15} = \frac{15 \times 12 + 8}{15} = \frac{180 + 8}{15} = \frac{188}{15}$

2. Mixed fraction = Quotient (Q) $\frac{\text{Remainder (R)}}{\text{Denominator (D)}}$

(a) $\frac{43}{8} = 5\frac{3}{8}$

$$\begin{array}{r} 5 \\ 8\overline{)\,43} \\ -\,40 \\ \hline 3 \end{array}$$

(b) $\frac{39}{4} = 9\frac{3}{4}$

$$\begin{array}{r} 9 \\ 4\overline{)\,39} \\ -\,36 \\ \hline 3 \end{array}$$

(c) $\frac{12}{11} = 1\frac{1}{11}$

$$\begin{array}{r} 1 \\ 11\overline{)\,12} \\ -\,11 \\ \hline 1 \end{array}$$

(d) $\frac{23}{2} = 11\frac{1}{2}$

$$\begin{array}{r} 11 \\ 2\overline{)\,23} \\ -\,2\downarrow \\ \hline 3 \\ -2 \\ \hline 1 \end{array}$$

3. (a) Since $2 \times 4 = 8$, So multiply

$7 \times 4 = 28$

$\frac{2 \times 4}{7 \times 4} = \frac{8}{28}$

$\therefore * = 28$

(b) $\frac{7}{9} = \frac{*}{63}$

Since $9 \times 7 = 63$

So, multiply $7 \times 7 = 49$

i.e, $\frac{7 \times 7}{9 \times 7} = \frac{49}{63}$

$\therefore * = 49$

(c) Since, $25 \div 5 = 5$, so we divide

$15 \div 5 = 3$

i.e, $\frac{15 \div 5}{25 \div 5} = \frac{3}{5}$

$\therefore * = 3$

(d) $\frac{11}{15} = \frac{*}{135}$

Since, $15 \times 9 = 135$, We multiply $11 \times 9 = 99$

$\frac{11 \times 9}{15 \times 9} = \frac{99}{135}$

$* = 99$

4. (a) $\frac{4}{9} = \frac{4 \times 4}{9 \times 4} = \frac{16}{36}$

(b) $\frac{4}{9} = \frac{4 \times 9}{9 \times 9} = \frac{36}{81}$

5. (a) $\frac{1}{4} = \frac{1 \times 7}{4 \times 7} = \frac{7}{28}$

(b) $\frac{1}{4} = \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$

6. 4 equivalent fraction of

(a) $\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{2 \times 3}{3 \times 3} = \frac{2 \times 4}{3 \times 4} = \frac{2 \times 5}{3 \times 5}$ $\therefore \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$

(b) $\frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{4 \times 3}{5 \times 3} = \frac{4 \times 4}{5 \times 4} = \frac{4 \times 5}{5 \times 5}$ $\therefore \frac{8}{10} = \frac{12}{15} = \frac{16}{20} = \frac{20}{25}$

(c) $\frac{5}{7} = \frac{5 \times 2}{7 \times 2} = \frac{5 \times 3}{7 \times 3} = \frac{5 \times 4}{7 \times 4} = \frac{5 \times 5}{7 \times 5}$ $\therefore \frac{10}{14} = \frac{15}{21} = \frac{20}{28} = \frac{25}{35}$

(d) $\frac{8}{11} = \frac{8 \times 2}{11 \times 2} = \frac{8 \times 3}{11 \times 3} = \frac{8 \times 4}{11 \times 4} = \frac{8 \times 5}{11 \times 5}$ $\therefore \frac{16}{22} = \frac{24}{32} = \frac{32}{44} = \frac{40}{55}$

7. (a) $\frac{10}{12} = \frac{10 \div 2}{12 \div 2} = \frac{5}{6}$

HCF of 10 and 12 is 2, divide 10, 12 by 2

2	10, 12
	5, 6

HCF = 2

(b) $\frac{112}{144} = \frac{112 \div 16}{144 \div 16} = \frac{7}{9}$

HCF of 112 and 144 is 16

2	112, 144
2	56, 72
2	28, 36
2	14, 18
	3, 4

$= 2 \times 2 \times 2 \times 2$

$= 16$

(c) $\frac{108}{144} = \frac{108 \div 36}{144 \div 36} = \frac{3}{4}$

HCF of 108 and 144 is 36. Divide 108 and 144 by 36

2	108, 144
2	54, 72
3	27, 36
3	9, 12
	7, 9

$2 \times 2 \times 3 \times 3$

$= 36$

(d) $\frac{42}{28}$

HCF of 42 and 28 is 14, Divide both of them by 14

$\frac{42 \div 14}{28 \div 14} = \frac{3}{2}$

2	42, 28
7	21, 14
	3, 2

HCF = $2 \times 7 = 14$

Exercise 7.3

1. (a) $\frac{3}{2} < \frac{5}{6}$ (Denominators are same, the one with greater numerator is greater $5 > 1$)

(b) $\frac{4}{7} < \frac{6}{7}$ (Denominators are same, the one with greater numerator is greater $4 > 6$)

(c) $\frac{4}{6} < \frac{5}{6}$ (Denominators are same, the one with greater numerator is greater $4 < 5$)

(d) $\frac{2}{11} < \frac{5}{11}$ (Denominators are same, the one with greater numerator is greater $2 < 5$)

(e) $\frac{7}{23} < \frac{20}{23}$ (Denominators are same, the one with greater numerator is greater $20 < 23$)

(f) $\frac{10}{19} < \frac{11}{19}$ (Denominators are same, the one with greater numerator is greater $10 < 11$)

2. (a) $\frac{4}{5} > \frac{5}{7}$, Both denominators are Co-prime

LCM of 7 and 5 is 35, Making denominators as 35

$\frac{4 \times 7}{5 \times 7} = \frac{28}{35}, \frac{5 \times 5}{7 \times 5} = \frac{25}{35}$

$\frac{28}{35} > \frac{25}{35}; \frac{4}{5} > \frac{5}{7}$

(b) $\frac{3}{8} < \frac{5}{6}$

LCM of 8 and 6 is 24 making denominator as 24

$24 \div 8 = 3, 24 \div 6 = 4$

$\frac{3 \times 3}{8 \times 3} = \frac{9}{24}, \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$

$\frac{9}{24} < \frac{20}{24}; \frac{3}{8} < \frac{5}{6}$

(c) $\frac{7}{11} < \frac{6}{7}$, Both denominaors are co-prime

LCM of 11 and 7 is 77, Making denominators as 77.

$\frac{7 \times 7}{11 \times 7} = \frac{49}{77}, \frac{6 \times 11}{7 \times 11} = \frac{66}{77}$

$\frac{49}{77} < \frac{66}{7}; \frac{7}{11} < \frac{6}{7}$

(d) $\frac{5}{6}$ (>) $\frac{9}{11}$ (Both denominator are co-prime)

LCM of 6 and 11 is 66 making denominators as 66.

$\frac{5 \times 11}{6 \times 11} = \frac{55}{66}, \frac{9 \times 6}{11 \times 6} = \frac{54}{66}$

$\frac{55}{66} > \frac{54}{66}$; $\frac{5}{6} > \frac{9}{11}$

(e) $\frac{2}{3}$ (>) $\frac{4}{9}$

Lcm of 3 and 9 is 9 making denominators as 9

$9 \div 3 = 3, 9 \div 9 = 1$

$\frac{2 \times 3}{3 \times 3} = \frac{6}{9}, \frac{4 \times 1}{9 \times 1} = \frac{4}{9}$

$\frac{6}{9} > \frac{4}{9}$; $\frac{2}{3} > \frac{4}{9}$

(f) $\frac{6}{13}$ (<) $\frac{3}{4}$

Both 13 and 14 are co-Primer.

LCM of 13 and 4 is .

$\frac{6 \times 4}{13 \times 4} = \frac{24}{52}, \frac{3 \times 13}{4 \times 13} = \frac{39}{52}$

$\frac{24}{52} < \frac{39}{52}; \frac{6}{13} < \frac{3}{4}$

3. (a) $\frac{4}{16} = \frac{9}{\boxed{36}}$

Cross multiply

$4 \times$ Number $= 16 \times 9$

$4 \times$ Number $= 144$

Number $= 144/4$, Number $= 36$

(b) $\frac{5}{6} = \frac{\boxed{15}}{18}$

Cross multiply

$5 \times 18 = 6 \times$ Number

$90 = 6 \times$ Number

Number $= \frac{90}{6} = 15$

(c) $\frac{4}{28} = \frac{2}{\boxed{14}}$

Cross multiplying

$4 \times$ Number $= 2 \times 28$

$4 \times$ Number $= 56$, Number $= 56/4$

Number $= 14$

(d) $\frac{7}{14} = \frac{2}{\boxed{4}}$

Cross multiplying

$7 \times$ Number 14×2

$7 \times$ Number 28

Number $= 28/7$

Number $= 4$

(e) $\frac{6}{2} = \frac{9}{\boxed{3}}$

Cross multiplying

$2 \times 9 = 6 \times$ Number

$18 = 6 \times$ Number

Number $= 18/6$ Number $= 3$

(f) $\frac{75}{25} = \frac{\boxed{15}}{5}$

Cross multiplying

$75 \times 5 = 25 \times$ Number

$75 = 25 \times$ Number, Numbers $= 375/25$ Number $= 15$

(g) $\frac{100}{300} = \frac{2}{\boxed{6}}$

Cros-multiplying

$100 \times$ Number $= 2 \times 300$

$100 \times$ Number $= 600$, Number $= 600/100$, Number $= 6$

(h) $\frac{16}{20} = \frac{\boxed{4}}{5}$

Cross multiplying

$16 \times 5 = 20 \times$ Number

$80 = 20 \times$ Number, Number $= 80/20$, Number $= 4$

4. (a) $\frac{1}{2}, \frac{13}{4}, \frac{5}{6}, \frac{7}{8}$

(LCM of 2, 4, 6 and 8 is 24)

Making denominators as 24.

$\frac{1 \times 12}{2 \times 12} = \frac{12}{24}, \frac{13 \times 6}{4 \times 6} = \frac{78}{24}, \frac{5 \times 4}{6 \times 4} = \frac{20}{24}, \frac{7 \times 3}{8 \times 3} = \frac{21}{24}$

2	2, 4, 6, 8
2	1, 2, 3, 4
2	1, 1, 3, 2
3	1, 1, 3, 1
	1, 1, 1, 1

LCM = 2 × 2 × 2 × 3

= 24

$\frac{12}{24} < \frac{20}{24} < \frac{21}{24} < \frac{78}{24}$ (12 < 20 < 21 < 78)

Hence; $\frac{1}{2} < \frac{5}{6} < \frac{17}{8} < \frac{13}{4}$

(b) $\frac{9}{4}, \frac{7}{9}, \frac{9}{5}, \frac{9}{6}$

LCM of 4, 9, 5 and 6 is 180 Making Denominators 180

$\frac{9 \times 45}{4 \times 45} = \frac{405}{180}, \frac{7 \times 20}{9 \times 20} = \frac{140}{180}, \frac{9 \times 36}{5 \times 36}, \frac{324}{180}$

$\frac{9 \times 30}{6 \times 30} = \frac{270}{180}$

2	4, 9, 5, 6
2	2, 9, 5, 3
3	1, 9, 5, 3
3	1, 3, 5, 1
5	1, 1, 5, 1
	1, 1, 1, 1

LCM = 2 × 2 × 3 × 3 × 5

= 180

$\frac{140}{180} < \frac{270}{180} < \frac{324}{180} < \frac{405}{180}$

(140 < 270 < 324 < 405)

Hence, $\frac{7}{9} < \frac{9}{6} < \frac{9}{5} < \frac{9}{4}$

(c) $\frac{2}{7}, \frac{7}{10}, \frac{11}{15}, \frac{11}{30}$ (LCM of 7, 10, 15 and 30 is 210 Making denominators as 210)

$\frac{2 \times 30}{7 \times 30} = \frac{60}{210}, \frac{7 \times 21}{10 \times 21} = \frac{147}{210}, \frac{11 \times 14}{15 \times 14} =$

$\frac{154}{210}, \frac{11 \times 7}{30 \times 7} = \frac{77}{210}$

2	7, 10, 15, 30
3	7, 5, 15, 15
5	7, 5, 5, 5
7	7, 1, 1, 1
	1, 1, 1, 1

LCM = 2 × 3 × 5 × 7

= 210

$\frac{60}{210} < \frac{77}{210} < \frac{147}{210} < \frac{54}{210}$

(60 < 77 < 147 < 154)

Hence, $\frac{2}{7} < \frac{11}{30} < \frac{7}{10} < \frac{11}{15}$

(d) $\frac{2}{7}, \frac{13}{25}, \frac{11}{14}, \frac{15}{28}$

LCM of 7, 25, 14 and 28 is making Denominator as 700

$\frac{2 \times 100}{7 \times 100} = \frac{200}{700}, \frac{13 \times 28}{25 \times 28} = \frac{364}{700}, \frac{11 \times 50}{14 \times 50}$

$= \frac{550}{700}, \frac{15 \times 25}{28 \times 25} = \frac{375}{700}$

2	7, 25, 14, 28
2	7, 25, 7, 14
7	7, 25, 7, 14
5	1, 25, 1, 1
5	1, 5, 1, 1
	1, 1, 1, 1

LCM = 2 × 2 × 7 × 5 × 5

= 700

$\frac{200}{780} < \frac{364}{780} < \frac{375}{780} < \frac{550}{780}$

(200 < 364 < 375 < 550)

Hence $\frac{2}{7} < \frac{13}{25} < \frac{15}{28} < \frac{11}{14}$

5. (a) $\frac{3}{4}, \frac{5}{8}, \frac{11}{12}, \frac{7}{24}$ (LCM of 4, 8, 12, and 24 is 24

Making Denominator as 24

$\frac{3 \times 6}{4 \times 6} = \frac{9}{24}, \frac{5 \times 3}{8 \times 3} = \frac{15}{24}, \frac{11 \times 2}{12 \times 2} =$

$\frac{22}{24}, \frac{7 \times 1}{24 \times 1} = \frac{7}{24}$

2	4, 8, 12, 24
2	2, 4, 6, 12
2	1, 2, 3, 6
3	1, 1, 3, 3
	1, 1, 1, 1

LCM = $2 \times 2 \times 2 \times 3 = 24$

$\frac{22}{24} > \frac{15}{24} > \frac{9}{24} > \frac{7}{24}$

$(22 > 15 > 9 > 7)$

Hence, $\frac{11}{12} > \frac{5}{8} > \frac{3}{4} > \frac{7}{24}$

(b) $\frac{3}{8}, \frac{5}{6}, \frac{2}{4}, \frac{1}{3}, \frac{6}{8}$ (LCM of 8, 6, 4, 3 and 8 is 21)

Making denominator as 24

$\frac{3 \times 3}{8 \times 3} = \frac{9}{24}, \frac{5 \times 4}{6 \times 4} = \frac{20}{24}, \frac{2 \times 6}{4 \times 6} = \frac{12}{24}$

$\frac{6 \times 3}{8 \times 3} = \frac{18}{24}, \frac{1 \times 6}{3 \times 8} = \frac{8}{24}$

2	8, 6, 4, 3,8
2	4, 3, 2, 3, 4
2	2, 3, 1, 3, 2
3	1, 3, 1, 3, 1
	1, 1, 1, 1, 1

$-2 \times 2 \times 2 \times 3 = 24$

$\frac{20}{24} > \frac{18}{24} > \frac{12}{24} > \frac{9}{24} > \frac{8}{24}$

$(20 > 18 > 12 > 9 > 8)$

Hence, $\frac{5}{6} > \frac{6}{8} > \frac{2}{4} > \frac{3}{8} > \frac{1}{3}$

(c) $\frac{8}{16}, \frac{8}{8}, \frac{8}{4}, \frac{8}{12}$

$\frac{8}{4} > \frac{8}{8} > \frac{8}{12} > \frac{8}{16}$

(When all numerators are same, the fractions with smallest denominator are greater. $= 4 < 8 < 12 < 16$ $\frac{8}{4} > \frac{8}{8} > \frac{8}{12} > \frac{8}{16}$)

2	16, 8, 4, 12
2	8, 4, 2, 6
2	4, 2, 1, 3
2	2, 1, 1, 3
3	1, 1, 1, 3
	1, 1, 1, 1

$2 \times 2 \times 2 \times 2 \times 3$

$= 48$

(d) $\frac{5}{9}, \frac{3}{12}, \frac{1}{3}, \frac{4}{15}$

(LCM of 9, 12, 3 and 15 is 180)

Making Denominator as 180.

$\frac{5 \times 20}{9 \times 20} = \frac{100}{180}, \frac{3 \times 15}{12 \times 15} = \frac{45}{180}, \frac{1 \times 60}{3 \times 60} = \frac{60}{180}, \frac{4 \times 12}{15 \times 12} = \frac{48}{180}$

$\frac{100}{180} > \frac{60}{180} > \frac{48}{180} > \frac{45}{180}$

$((100 > 60 > 48 > 45))$

2	9, 12, 3, 15
2	9, 6, 3, 15
3	9, 3, 3, 15
3	3, 1, 1, 5
5	1, 1, 1, 5
	1, 1, 1, 1

LCM = $2 \times 2 \times 3 \times 3 \times 5$

Hence, $\frac{5}{9} > \frac{1}{3} > \frac{4}{15} > \frac{3}{12}$

Puzzle

x, mass of water + basin

y, fraction of basin filled

Basin	Mass total	Fraction Filled
A	3.1	0.5 or half
B	2.2	0.2 or a fifth
C	2.8	? need to find

slope $\frac{1}{3}$

Using point - Slope from and point (3.1, 1/2)

$y - \frac{1}{2} = \left(\frac{1}{3}\right) = (x - 3.1)$

$y = \frac{x}{3} - \frac{8}{15}$

Question asked manus, find y when x is 2.8 just substitue and evaluate y.

$y = \frac{2.8}{3} - \frac{8}{15}$

$y = \frac{2.8 = 5 - 8}{15}$

$y = \frac{6}{15}$

Exercise 7.4

1. (a) $\frac{3}{4} + \frac{5}{12} + \frac{2}{3}$ (LCM of 4, 12, and 3 is 12)

$\frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}$, $\frac{5 \times 1}{12 \times 1} = \frac{5}{12}$, $\frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

2	4, 12, 3
3	2, 6, 3
5	1, 3, 3
	1, 1, 1

LCM = 2 × 2 × 3

=12

$\frac{9}{12} + \frac{5}{12} + \frac{8}{12} = \frac{9 + 5 + 8}{12} = \frac{22}{12}$

$\frac{22 \div 2}{12 \div 2} = \frac{11}{6} = 1\frac{5}{6}$

(HCF of 22 and 12 si 2)

(b) $\frac{1}{6} + \frac{2}{3}$ (LCM of 6 and 3 is 6)

2	6, 3
3	3, 3
	1, 1

LCM = 2 × 3

= 6

$\frac{1 \times 1}{6 \times 1} = \frac{1}{6}$, $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$

$\frac{1}{6} + \frac{4}{6} = \frac{1 + 4}{6} = \frac{5}{6}$

(c) $\frac{1}{2} + \frac{5}{6} + \frac{7}{3}$ (LCM of 2, 6 and 3 is 6)

2	2, 6, 3
3	1, 3, 3
	1, 1, 1

$\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$, $\frac{5 \times 1}{6 \times 1} = \frac{5}{6}$, $\frac{7 \times 2}{3 \times 2} = \frac{14}{6}$

$\frac{3}{6} + \frac{5}{6} + \frac{14}{6} = \frac{3 + 5 + 14}{6} = \frac{22}{6}$

(HCF of 22 and 6 is 2)

$\frac{22 \div 2}{6 \div 2} = \frac{11}{3} = 3\frac{2}{3}$

(HCF of 22 and 6 is 2)

(d) $\frac{1}{2} + \frac{1}{12}$ (LCM of 2 and 12 is 12)

2	2, 12
2	1, 6
3	1, 3
	1, 1

LCM = 3 × 2 × 2

= 12

$\frac{1 \times 6}{2 \times 6} = \frac{6}{12}$, $\frac{1 \times 1}{12 \times 1} = \frac{1}{12}$

$\frac{6}{12} + \frac{1}{12} = \frac{6 + 1}{12} = \frac{7}{12}$

(e) $\frac{6}{10} + 3\frac{1}{12}$ ($3\frac{1}{12} = \frac{2 \times 3 + 1}{2} = \frac{6 + 1}{2}$ $= \frac{7}{2}$)

$\frac{6}{10} + \frac{7}{2}$ (LCM of 10 and 2 is 10)

2	2, 10
5	1, 5
	1, 1

$\frac{6 \times 1}{10 \times 1} = \frac{6}{10}$, $\frac{7 \times 5}{2 \times 5} = \frac{35}{10}$

$\frac{6}{10} + \frac{35}{10} = \frac{6 \times 35}{10} = \frac{41}{10} = 4\frac{1}{10}$

(f) $2\frac{1}{9}+1\frac{1}{3}\left(1\frac{1}{3}=\frac{3\times1+1}{3}=\frac{3+1}{3}=\frac{4}{3}\right)$

$\left(2\frac{1}{9}=\frac{9\times2+1}{9}=\frac{18+1}{9}=\frac{19}{19}\right)$

$\frac{19}{9}+\frac{4}{3}$ (LCM of 9 and 3 is 9)

3	3, 9
3	1, 3
	1, 1

LCM = 3×3

$= 9$

$\frac{19\times1}{9\times1}=\frac{19}{9}, \frac{4\times3}{3\times3}=\frac{12}{9}$

$\frac{19}{9}+\frac{12}{9}=\frac{19+12}{9}$

$=\frac{31}{9}=3\frac{4}{9}$

(g) $\frac{3}{4}+\frac{1}{8}$ (LCM of 4 and 8 is 8)

$\frac{3\times2}{4\times2}=\frac{6}{8}, \frac{1\times1}{8\times1}=\frac{1}{8}$

2	4, 8
2	2, 4
2	1, 2
	1, 1

LCM = $2\times2\times2$

$= 8$

$\frac{6}{8}+\frac{1}{8}=\frac{6+1}{8}=\frac{7}{8}$

(h) $\frac{1}{4}+\frac{3}{8}$ (LCM of 4 and 8 is 8)

2	4, 8
2	2, 4
2	1, 2
	1, 1

LCM = $2\times2\times2$

$= 8$

$\frac{1\times2}{4\times2}=\frac{2}{8}, \frac{3\times1}{8\times1}=\frac{3}{8}$

$\frac{2}{8}+\frac{3}{8}=\frac{2+3}{8}$

$\frac{5}{8}$

(i) $1\frac{4}{5}+2\frac{7}{10}$ $\left(1\frac{4}{5}=\frac{5\times1+4}{5}=\frac{5+4}{5}\right.$

$\left.=\frac{9}{5}\right)$

$\left(2\frac{7}{10}=\frac{10\times2+7}{10}=\frac{20+7}{10}=\frac{27}{10}\right)$

$\frac{9}{5}+\frac{27}{10}$ (LCM of 5, 10 is 10)

2	5, 10
5	5, 5
	1, 1

LCM = $2\times5=10$

$\left(2\frac{7}{10}=\frac{10\times2+7}{10}=\frac{20+7}{10}=\frac{21}{10}\right)$

$\frac{9\times2}{5\times2}=\frac{18}{10}, \frac{27\times1}{10\times1}=\frac{27}{10}$

$\frac{18}{10}+\frac{27}{10}=\frac{18+27}{10}=\frac{45}{10}=\frac{9}{2}$

$=4\frac{1}{2}$

(j) $\frac{3}{10}+\frac{4}{5}+\frac{1}{2}$ (LCM of 10, 5 and 2 is 10)

3	10, 5, 2
3	5, 5, 1
	1, 1, 1

LCM = 2×5

$= 10$

$\frac{3\times1}{10\times1}=\frac{3}{10}, \frac{4\times2}{5\times2}=\frac{8}{10}, \frac{1\times5}{1\times5}=\frac{5}{10}$

$\frac{3}{10}+\frac{8}{10}+\frac{5}{10}=\frac{3+8+5}{10}=\frac{16}{10}$

$\frac{16\div2}{10\div2}=\frac{8}{5}$

$=1\frac{3}{5}$

(k) $\frac{5}{6} + \frac{7}{12}$ (LCM of 6 and 12 is 12)

$\frac{5 \times 2}{6 \times 2} = \frac{10}{12}, \frac{7 \times 1}{12 \times 1} = \frac{7}{12}$

$\frac{10}{12} + \frac{7}{12} = \frac{10 + 7}{12} = \frac{17}{12} = 1\frac{5}{12}$

(l) $\frac{8}{10} + \frac{1}{2}$ (LCM of 10 and 2 is 10)

2	2, 10
5	1, 5
	1, 1

$\frac{8 \times 1}{10 \times 1} = \frac{8}{10}, \frac{1 \times 5}{2 \times 5} = \frac{5}{10}$

$\frac{8}{10} + \frac{5}{10} = \frac{13}{10} = 1\frac{3}{10}$

(m) $\frac{3}{10} + \frac{1}{2} + \frac{3}{5}$ (LCM of 10, 2 and 5 is 10)

2	10, 5, 2
5	5, 5, 1
	1, 1, 1

LCM = $2 \times 5 = 10$

$\frac{3 \times 1}{10 \times 1} = \frac{3}{10}, \frac{1 \times 5}{2 \times 5} = \frac{5}{10}, \frac{3 \times 2}{5 \times 2} = \frac{6}{10}$

$\frac{3}{10} + \frac{5}{10} + \frac{6}{10} = \frac{3 + 5 + 6}{10}$

$= \frac{14}{10} = \frac{7}{5} = 1\frac{2}{5}$

(n) $1\frac{5}{8} + \frac{1}{8}$ ($1\frac{5}{8} = \frac{8 \times 1 + 5}{8} = \frac{8 + 5}{8} = \frac{13}{8}$)

$\frac{13}{8} + \frac{1}{8} = \frac{13 + 1}{8} = \frac{14}{8} = \frac{14 \div 2}{8 \div 2} = \frac{7}{4}$

$= 1\frac{3}{4}$

(o) $\frac{7}{12} + \frac{1}{3}$ (LCM of 12 and 3 is 12)

$\frac{7 \times 1}{12 \times 1} = \frac{7}{12}, \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

$\frac{7}{12} + \frac{4}{12} = \frac{11}{12}$

(p) $\frac{3}{10} + \frac{2}{5}$ (LCM of 10 and 5 is 10)

$\frac{3 \times 1}{10 \times 1} = \frac{3}{10}, \frac{2 \times 2}{5 \times 2} = \frac{4}{10}$

$\frac{3}{10} + \frac{4}{10} = \frac{3 + 4}{10} = \frac{7}{10}$

2. (a) $\frac{7}{8} - \frac{1}{8}$

$= \frac{7 - 1}{8}$

$= \frac{6}{8}$

(b) $\frac{7}{12} - \frac{5}{12}$

$= \frac{7 - 5}{12}$

$= \frac{2}{12}$

(c) $4\frac{3}{7} - 2\frac{4}{7}$ ($4\frac{3}{7} = \frac{7 \times 4 + 3}{7} = \frac{28 + 3}{12}$

$= \frac{31}{7}$)

($2\frac{4}{7} = \frac{7 \times 2 + 4}{7} = \frac{14 + 7}{7} = \frac{18}{7}$)

$\frac{31}{7} - \frac{18}{7} = \frac{31 - 18}{7}$

$= \frac{31}{7} = 1\frac{4}{7}$

(d) $\frac{5}{6} - \frac{4}{9}$ (LCM of 6 and 9 is 36)

2	6, 9
3	3, 9
3	1, 3
	1, 1

LCM = $2 \times 3 \times 3$

$\frac{5 \times 3}{6 \times 3} = \frac{15}{18}, \frac{4 \times 2}{9 \times 2} = \frac{6}{18}$

$\frac{15}{18} - \frac{8}{18} = \frac{15 - 8}{18}$

$= \frac{7}{18}$

(e) $\frac{1}{2} - \frac{3}{8}$ [LCM of 2 and 8 is 8]

$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}, \frac{3 \times 1}{8 \times 1} = \frac{3}{8}$

$\frac{4}{8} - \frac{3}{8} = \frac{1}{8}$

2	2, 8
2	1, 4
2	1, 2
	1, 1

LCM = $2 \times 2 \times 2 = 8$

(f) $\frac{5}{8} - \frac{7}{12}$ (LCM of 8 and 12 is 24)

2	8, 12
2	4, 6
2	2, 3
3	1, 3
	1, 1

LCM = $2 \times 2 \times 2 \times 3$

$= 24$

$\frac{5 \times 3}{8 \times 3} = \frac{15}{24}, \frac{7 \times 2}{12 \times 2} = \frac{14}{24}$

$\frac{15}{24} - \frac{14}{24} = \frac{15 - 14}{24}$

$= \frac{1}{24}$

(g) $2\frac{7}{9} - 1\frac{8}{15}$ ($2\frac{7}{9} = \frac{9 \times 2 + 7}{9} = \frac{18 + 7}{24}$

$= \frac{23}{15}$)

$\frac{25}{9} - \frac{23}{15}$ ($1\frac{8}{15} = \frac{15 \times 1 + 8}{15} = \frac{15 + 8}{15}$

$= \frac{23}{15}$)

3	9, 15
3	3, 5
5	1, 5
	1, 1

LCM = $3 \times 3 \times 5$

$= 45$

$\frac{25 \times 2}{9 \times 5} = \frac{125}{45}, \frac{23 \times 3}{15 \times 3} = \frac{69}{45}$

$\frac{125}{45} - \frac{69}{45} = \frac{125 - 69}{45} = \frac{56}{45} = 1\frac{11}{45}$

(h) $3\frac{5}{8} - 2\frac{5}{12}$ ($3\frac{5}{8} = \frac{8 \times 3 + 5}{8} = \frac{24 + 5}{8}$

$= \frac{29}{8}$)

($2\frac{5}{12} = \frac{12 \times 2 + 5}{12} = \frac{24 + 5}{12} = \frac{29}{12}$)

$\frac{29 \times 2}{12 \times 2} = \frac{58}{24} = \frac{58 \div 2}{24 \div 2} = \frac{29}{12} = 2\frac{5}{12}$

2	8, 12
2	4, 6
2	2, 3
3	1, 3
	1, 1

LCM = $2 \times 2 \times 2 \times 3$

$= 24$

$\frac{87}{24} - \frac{58}{24} = \frac{87 - 58}{24} = \frac{29}{24}$

(i) $2\frac{3}{10} - 1\frac{7}{15}$ ($2\frac{3}{10} = \frac{10 \times 2 + 3}{10} =$

$\frac{20 + 3}{10} = \frac{23}{10}$)

$\frac{23}{10} - \frac{22}{15}$

($1\frac{7}{15} = \frac{15 \times 1 + 7}{15} = \frac{15 + 7}{15} = \frac{22}{15}$)

2	10, 15
3	5, 15
5	5, 5
	1, 1

LCM = $2 \times 3 \times 5$

$= 30$

LCM of 10 and 15 is 30

$\frac{23 \times 3}{10 \times 3} = \frac{69}{30}, \frac{22 \times 2}{15 \times 2} = \frac{44}{30}$

$\frac{69}{30} - \frac{44}{30} = \frac{69 - 44}{30} = \frac{25}{30} = \frac{5}{6}$

(j) $6\frac{2}{3} - 3\frac{3}{4}$ ($6\frac{2}{3} = \frac{3 \times 6 + 2}{3} = \frac{18 + 2}{3}$

$= \frac{20}{3}$)

($3\frac{3}{4} = \frac{4 \times 3 + 3}{4} = \frac{12 + 3}{4} = \frac{15}{4}$)

$\frac{20}{3} - \frac{15}{4}$

$\frac{80}{12} = \frac{45}{12} = \frac{80 - 45}{12} = \frac{35}{12} = 2\frac{11}{12}$

$\frac{20 \times 4}{3 \times 4} = \frac{82}{12}, \frac{15 \times 3}{4 \times 3} = \frac{45}{12}$

(k) $7 - 5\frac{2}{3}$ ($5\frac{2}{3} = \frac{3 \times 5 + 2}{3} = \frac{15 + 2}{3}$

$= \frac{17}{3}$

$\frac{7}{1} - \frac{17}{3}$ (LCM of 1 and 3 is 3)

$\frac{7 \times 3}{1 \times 3} = \frac{21}{3}$ $\frac{17 \times 1}{3 \times 1} = \frac{17}{3}$

$\frac{21}{3} - \frac{17}{3} = \frac{21 - 17}{3} = \frac{4}{3} = 1\frac{1}{3}$

(l) $10 - 6\frac{3}{8}$ ($6\frac{3}{8} = \frac{8 \times 6 + 3}{8} = \frac{48 + 3}{8} = \frac{51}{8}$

$10 - 5\frac{1}{8}$ (Lcm of 1 and 8 is 8)

$\frac{10 \times 8}{1 \times 8} = \frac{80}{8}, \frac{51 \times 1}{8 \times 1} = \frac{51}{8}$

$\frac{80}{8} - \frac{51}{8} = \frac{80 - 51}{8} = \frac{29}{8} = 3\frac{5}{8}$

3. Time spent in painting toy Aeroplane = $\frac{1}{3}$

Time spent in polishing shoes = $\frac{1}{6}$

Total time spent: Time spent in painting toy + Time spent in polishing shoes

= $\frac{1}{3}$ of hours + $\frac{1}{6}$ of hours (1 hour = 60 minutes)

$\frac{1}{3}$ of 60 minutes = $\frac{60}{3}$ minutes = 20 minutes

$\frac{1}{6}$ of 60 minutes = $\frac{60}{6}$ minutes = 10 minutes

20 minutes + 10 minutes = 30 minutes

Answer: Rahul spent 30 minutes on painting his toy and polishing his shoes

4. Amout of water : $\frac{1}{2}l$

Amount of Orange sqash: $\frac{1}{8}l$

Amount of Mixture: Amount of Water + Amont of Orange squash

= $\left(\frac{1}{2} + \frac{1}{8}\right)l$ LCM of 2 and 8 is 8

$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}, \frac{1 \times 1}{8 \times 1} = \frac{4}{8}$

$\frac{4}{8} + \frac{1}{8} = \frac{4 + 1}{8} = \frac{5}{8}$

2	2, 8
2	1, 4
2	1, 2
	1, 1

LCM: $2 \times 2 \times 2 = 8$

Answer: Ananya got $\frac{5}{8}$ litre of mixture.

5. Area covered with lettuce: $\frac{1}{6}$

Area covered with tomato plants: $\frac{5}{12}$

Fraction of area planted with lettuce + Area covered with Tomato plants

= $\frac{1}{6} + \frac{5}{12}$ (LCM of 6 and 12 is 12)

2	6, 12
2	3, 4
2	3, 2
3	3, 1
	1, 1

= $\frac{1 \times 2}{6 \times 2} = \frac{2}{12}, \frac{5 \times 1}{12 \times 1} = \frac{5}{12}$

$\frac{2}{12} + \frac{5}{12} = \frac{2 + 5}{12} = \frac{7}{12}$

Answer: $\frac{7}{12}$ Area of Vegetable garden is planted with leteuce Tomato plants.

6. Fraction of cake Rahul ate: $\frac{2}{5}$

Fraction of cake Jai ate: $\frac{3}{10}$

(a) $\frac{2}{5}, \frac{3}{10}$ Cross multiplying $\frac{2}{5}$ and $\frac{3}{10}$

$\frac{2}{5} \times \frac{3}{10}$

$2 \times 10, 3 \times 5$

20, 15

$20 > 15$

$\frac{2}{5} > \frac{3}{10}$; Rahul > Jai

Answer: Rahul ate more cake than Jai.

(b) How more cake Rahul ate than Jai: Fraction of cake Rahul ate – Fraction of cake Jai ate

$= \frac{2}{5} - \frac{3}{10}$ (LCM of 5 and 10 is 10)

$\frac{2 \times 2}{5 \times 2} = \frac{4}{10}$

2	5, 10
5	5, 5
	1, 1

$\frac{4}{10} - \frac{3}{10} = \frac{4-3}{10} = \frac{1}{10}$

Answer: Rahul ate $\frac{1}{10}$ part of cake more than Jai.

Review Exercise

1. Equivalent fraction of:

(a) $\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}, \frac{1 \times 3}{3 \times 3} = \frac{3}{9}, \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

(b) $\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}, \frac{2 \times 3}{3 \times 3} = \frac{6}{9}, \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

(c) $\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}, \frac{3 \times 3}{4 \times 3} = \frac{9}{12}, \frac{3 \times 4}{3 \times 4} = \frac{12}{16}$

(d) $\frac{1}{4} = \frac{1 \times 2}{4 \times 2} = \frac{2}{8}, \frac{1 \times 3}{4 \times 3} = \frac{3}{12}, \frac{1 \times 4}{4 \times 4} = \frac{4}{16}$

2. $\frac{1}{2} + \frac{1}{3}$ (LCM 2 and 3 is 6)

2	2, 3
3	1, 3
	1, 1

$\frac{1 \times 3}{2 \times 3} = \frac{3}{6}, \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$

$\frac{3}{6} + \frac{2}{6} = \frac{3+2}{6} = \frac{5}{6}$

(b) $\frac{3}{4} + \frac{1}{6}$ (LCM of 4 and 6 is 12)

2	4, 6
2	2, 3
3	1, 3
	1, 1

LCM = $2 \times 2 \times 3$

$= 12$

$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}, \frac{1 \times 2}{6 \times 2} = \frac{2}{12}$

$\frac{9}{12} + \frac{2}{12} = \frac{9+2}{12} = \frac{11}{12}$

(c) $\frac{3}{4} + \frac{1}{8}$ (LCM of 4 and 8 is 8)

2	4, 8
2	2, 4
2	1, 2
	1, 1

LCM = $2 \times 2 \times 2 = 8$

$\frac{3 \times 2}{4 \times 2} = \frac{6}{8}, \frac{1 \times 1}{8 \times 1} = \frac{1}{8}$

$\frac{6}{8} + \frac{1}{8} = \frac{6+1}{8} = \frac{7}{8}$

$\frac{1}{8} + \frac{7}{8} = \frac{1+7}{8} = \frac{8}{8} = \frac{8 \div 8}{8 \div 8} = \frac{1}{1} = 1$

(d) $\frac{7}{12} - \frac{1}{4}$ (LCM of 12 and 4 is 12)

2	4, 12
2	2, 6
3	1, 3
	1, 1

LCM = $2 \times 2 \times 3$

$= 12$

$\frac{7 \times 1}{12 \times 1} = \frac{7}{12}, \frac{1 \times 3}{4 \times 3} = \frac{3}{12}$

$\frac{7}{12} - \frac{3}{12} = \frac{7-3}{12} = \frac{4}{12} = \frac{1}{6}$

$\frac{1 \div 2}{6 \div 2} = \frac{1}{3}$

(e) $\frac{1}{4} - \frac{1}{3}$ (LCM of 4 and 3 is 12)

2	4, 3
2	2, 3
3	1, 3
	1, 1

LCM = $2 \times 2 \times 3$

$=12$

$\frac{1 \times 3}{4 \times 3} = \frac{3}{12}, \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

$\frac{3}{12} - \frac{4}{12} = \frac{3-4}{12} = \frac{-1}{12}$

3. (a) $\frac{3}{5} + \frac{4}{7}$ (LCM of 5 and 7 is 35)

$\frac{3 \times 7}{5 \times 7} = \frac{21}{35}, \frac{4 \times 5}{7 \times 5} = \frac{20}{35}$

$\frac{21}{35} + \frac{20}{35} = \frac{21+20}{35} = \frac{41}{35} = 1\frac{6}{35}$

(b) $\frac{8}{13} + 1\frac{3}{4}$ ($1\frac{3}{4} = \frac{4 \times 1 + 3}{4} = \frac{4+3}{4}$

$= \frac{7}{4}$)

$\frac{8}{13} + \frac{7}{4}$ (LCM of 13 and 4 is 52)

2	13, 4
2	13, 2
13	13, 1
	1, 1

LCM = $2 \times 2 \times 13$

$= 52$

$\frac{8 \times 4}{13 \times 4} = \frac{32}{52}, \frac{7 \times 13}{4 \times 13} = \frac{91}{52}$

$\frac{32}{52} + \frac{91}{52} = \frac{32+91}{52} = \frac{123}{52}$

$= 2\frac{13}{52}$

(c) $1\frac{7}{8} + 4\frac{1}{5}$ ($1\frac{7}{8} = \frac{8 \times 1 + 7}{8} = \frac{8+7}{8}$

$= \frac{15}{8}$)

($4\frac{1}{5} = \frac{5 \times 4 + 1}{5} = \frac{20+1}{5} = \frac{21}{5}$)

$\frac{15 \times 5}{8 \times 5} = \frac{75}{40}, \frac{21 \times 8}{5 \times 8} = \frac{168}{40}$

2	8, 5
2	4, 5
2	2, 5
5	1, 5
	1, 1

LCM = $2 \times 2 \times 2 \times 5 = 40$

$\frac{75}{40} + \frac{168}{40} = \frac{75+168}{40} = \frac{243}{40}$

(d) $\frac{8}{9} + \frac{5}{6} + \frac{4}{12}$ (LCM of 9, 6 and 12 is 36)

2	9, 6, 12
2	9, 3, 4
2	9, 3, 2
3	9, 3, 1
3	3, 1, 1
	1, 1, 1

LCM = $2 \times 2 \times 2 \times 3 \times 3 = 72$

$\frac{8 \times 4}{9 \times 4} = \frac{24}{36}, \frac{5 \times 6}{6 \times 6} = \frac{30}{36}, \frac{4 \times 3}{12 \times 3}$

$= \frac{12}{36}$

$\frac{24}{36} + \frac{30}{36} + \frac{12}{36} = \frac{24 \times 30 + 12}{36}$

$= \frac{66}{36}$

$\frac{66 \div 6}{36 \div 6} = \frac{11}{6} = 1\frac{5}{6}$

(e) $2\frac{1}{3} - 1\frac{1}{6}$ ($2\frac{1}{3} = \frac{3 \times 2 + 1}{3} =$

$\frac{6+1}{3} = \frac{7}{3}$)

2	3, 6
3	3, 3
	1, 1

LCM = $2 \times 3 = 6$

$\left(1\frac{1}{6} = \frac{6 \times 1 + 1}{6} = \frac{6 + 1}{6} = \frac{7}{6}\right)$

$\frac{7}{3} - \frac{7}{6}$

$\frac{7 \times 2}{3 \times 2} = \frac{14}{6}, \frac{7 \times 1}{6 \times 1} = \frac{7}{6}$

$\frac{14}{6} - \frac{7}{6} = \frac{14 - 1}{6} = \frac{7}{6} = 1\frac{1}{6}$

(f) $4\frac{1}{2} - 2\frac{1}{8}$ $\left(4\frac{1}{2} = \frac{2 \times 4 + 1}{2} = \frac{8 + 1}{2} = \frac{9}{2}\right)$

2	2, 8
2	1, 4
2	1, 2
	1, 1

LCM = $2 \times 2 \times 2$

$= 8$

$\left(2\frac{1}{8} = \frac{8 \times 2 + 1}{8} = \frac{16 + 1}{8} = \frac{17}{8}\right)$

$\frac{9}{2} - \frac{17}{8}$ (LCM of 2 and 8 is 8)

$\frac{9 \times 4}{2 \times 4} = \frac{36}{8}, \frac{17 \times 1}{8 \times 1} = \frac{17}{8}$

$\frac{36}{8} - \frac{17}{8} = \frac{36 - 17}{8} = \frac{19}{8}$

$= 2\frac{3}{8}$

(g) $\frac{3}{8} + \frac{5}{6} - \frac{1}{3}$ (LCM of 4, 6, 3 is 12)

$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}, \frac{5 \times 2}{6 \times 2} = \frac{10}{12}, \frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

2	4, 6, 3
2	2, 3, 3
3	1, 3, 3
	1, 1, 1

LCM = $2 \times 2 \times 3$

$=12$

$\frac{9}{12} + \frac{10}{12} - \frac{4}{12} = \frac{9 + 10 - 4}{12}$

$= \frac{19 - 4}{12} = \frac{15}{12} = \frac{15 \div 3}{12 \div 3} = \frac{5}{4} = 1\frac{1}{4}$

(HCF of 15 and 12 is 3)

(h) $7\frac{1}{4} + 2\frac{1}{6} - 3\frac{7}{8}$

$7\frac{1}{4} = \frac{4 \times 7 + 1}{4} = \frac{28 + 1}{4} = \frac{29}{4}$

$2\frac{1}{6} = \frac{6 \times 2 + 1}{6} = \frac{12 + 1}{6} = \frac{13}{6}$

$3\frac{7}{8} = \frac{8 \times 3 + 7}{8} = \frac{24 + 7}{8} = \frac{31}{8}$

$\frac{29}{4} + \frac{13}{6} - \frac{31}{8}$ (LCM of 4, 6, & 8 is 24)

$\frac{29 \times 6}{4 \times 6} = \frac{174}{24}, \frac{13 \times 4}{6 \times 4} = \frac{52}{24},$

$\frac{31 \times 3}{8 \times 3} = \frac{93}{24}$

$\frac{174}{24} + \frac{52}{24} - \frac{93}{24} = \frac{174 + 52 - 93}{24} = \frac{133}{24}$

$= 5\frac{13}{24}$

4. Total Quantity of sweets = $\frac{1}{2}$kg

Quantity of cookies left are eaten by his children = $\frac{1}{10}$kg

Quantity of Cookies left: Total quantity – Left cookies = $\left(\frac{1}{2} - \frac{1}{10}\right)$ kg

LCM of 2 and 10 is 10

2	2, 10
5	1, 5
	1, 1

LCM = $2 \times 5 = 10$

$\frac{1 \times 5}{2 \times 5} = \frac{5}{10}, \frac{1 \times 1}{10 \times 1} = \frac{1}{10}$

$\left(\frac{5}{10} - \frac{1}{10}\right)$ kg $= \left(\frac{5 - 1}{10}\right)$ kg $= \frac{4}{10}$ kg

$\frac{4}{10} = \frac{9 \div 2}{10 \div 2} = \frac{2}{5}$ (HCF of 4 and 10 is 2)

Answer: Mr. Gautam's children have eaten $\frac{2}{5}$kg of cookies.

5. Fraction of wall painted by Preeti = $\frac{7}{10}$

Fraction of wall painted by Champa = $\frac{1}{5}$

Total fraction of wall painted: Fraction of wall painted or preeti + Fraction of wall painter by Champa.

$= \frac{7}{10} + \frac{1}{5}$ (Lcm of 10 & 5 is 10)

2	10, 5
5	5, 5
	1, 1

LCM = $2 \times 5 = 10$

$\frac{7 \times 1}{10 \times 1} = \frac{7}{10}, \frac{1 \times 2}{5 \times 2} = \frac{2}{10}$

$\frac{7}{10} + \frac{2}{10} = \frac{7+2}{10} = \frac{9}{10}$

Answer: $\frac{9}{10}$ fraction of wall was painted.

6. Fraction of money spent on Books: $\frac{1}{2}$

Fraction of money spent on food: $\frac{1}{8}$

Total Fraction of money spent: Fraction of money spent of Books + Fraction of money spent on food

$= \frac{1}{2} + \frac{1}{8}$ (LCM of 2 and 8 is 8)

2	2, 8
2	1, 4
2	1, 2
	1, 1

LCM = $2 \times 2 \times 2$

$= 18$

$= \frac{1}{2} = \frac{1 \times 4}{2 \times 4} = \frac{4}{8}, \frac{1 \times 1}{8 \times 1} = \frac{1}{8}$

$\frac{4}{8} + \frac{1}{8} = \frac{4+1}{8} = \frac{5}{8}$

Answer: $\frac{5}{8}$ Fraction of money was spent upon food & Books.

7. Fraction of pages written by Neha on Saturday: $15\frac{1}{6}$ pages = $(15\frac{1}{6} = \frac{6 \times 15 + 1}{6} = \frac{90+1}{6} = \frac{91}{6})$ pages

Fraction of pages written by Neha on Sunday: $17\frac{7}{12}$ pages = $(17\frac{7}{12} = \frac{12 \times 17 + 7}{2} = \frac{204+7}{12} = \frac{211}{12}) = \frac{211}{12}$ pages

Fraction of pages written by Neha on Saturday than on Sunday: $(\frac{211}{12} - \frac{182}{12})$ pages

$\frac{91 \times 1}{6 \times 1} = \frac{91}{6}, \frac{91 \times 2}{6 \times 2} = \frac{182}{12}$

2	6, 12
2	3, 6
3	3, 3
	1, 1

$\frac{211}{12} - \frac{182}{12} = \frac{29}{12} = 2\frac{5}{12}$

LCM: $2 \times 2 \times 3$

$= 12$

Answer: $2\frac{2}{15}$ pages were written by Neha more on Sunday than on Saturday

8. Time given to Ansh to finish the test: $1\frac{1}{2}$ hours $\left(1\frac{1}{2} = \frac{2 \times 1 + 1}{2} = \frac{2+1}{2} = \frac{3}{2}\right)$

$= \frac{3}{2}$

Time in which Ansh actuallly finished the test: $1\frac{1}{6}\left(1\frac{1}{6} = \frac{6 \times 1 + 1}{6} = \frac{6+1}{6} = \frac{7}{6}\right)$

$= \frac{7}{6}$

How much early he finished the test: Total time given – Time on which he finished the test = $\left(\frac{3}{2} - \frac{7}{6}\right)$hours

$\frac{3}{2} = \frac{3 \times 3}{2 \times 3} = \frac{9}{6}, \frac{7 \times 1}{6 \times 1} = \frac{7}{6}$

2	2, 6
3	1, 3
	1, 1

LCM = $2 \times 3 = 6$

$\frac{9}{6} - \frac{7}{6} = \frac{9-7}{6} = \frac{2}{6} = \frac{2 \div 2}{6 \div 2} = \frac{1}{3}$

Answer: Ansh finished the test $\frac{1}{3}$ hours earlier.

9. Paint used to paint the hall: $2\frac{1}{2}$ tins ($2\frac{1}{2} = \frac{2 \times 2 + 1}{2} = \frac{4+1}{2} = \frac{5}{2}$) = $\frac{5}{2}$ tins

How much less paint is used to paint the room: $1\frac{1}{4}$ tins ($1\frac{1}{4} = \frac{4 \times 1 + 1}{4} = \frac{4+1}{2} = \frac{5}{4}$)

= $\frac{5}{4}$ tins

Paint used to paint the room: Paint used to paint the hall – Less paint used to paint the room.

$= \left(\frac{5}{2} - \frac{5}{4}\right)$ (LCM of 2 & 4 is 4)

2	2, 4
2	1, 2
	1, 1

LCM = 2×2

$= 4$

$= \frac{5 \times 2}{2 \times 2} = \frac{10}{4}, \frac{4 \times 1}{4 \times 1} = \frac{4}{4}$

$\frac{10}{4} - \frac{5}{4} = \frac{10-5}{4} = \frac{5}{4}$

Answer: $\frac{5}{4}$ tins of paint was used to paint the room.

10. Weight of Brick: $2\frac{1}{5}$kg ($2\frac{1}{5} = \frac{5 \times 2 + 1}{5}$

$= \frac{10+1}{5} = \frac{11}{5}$)

Weight of stone: $1\frac{1}{10}$kg lighter than brick

($1\frac{1}{10} = \frac{10 \times 1 + 1}{10} = \frac{10+1}{10} = \frac{11}{10}$)

$=2\frac{1}{5}$kg $- 1\frac{1}{10}$kg (LCM of 5 and 10 is 10)

2	5, 10
5	5, 5
	1, 1

LCM = $2 \times 5 = 10$

$= \left(\frac{11}{5} - \frac{11}{10}\right)$kg

$\frac{11 \times 2}{5 \times 2} = \frac{22}{10}, \frac{11 \times 1}{10 \times 1} = \frac{11}{10}$

$\left(\frac{22}{10} - \frac{11}{10}\right) = \frac{22-11}{10} = \frac{11}{10}$

Answer: Weight of stone is $\frac{11}{10}$kg

Multiple choice Questions

1. (a) 7

2. (b) is equal to 1

3. (c) Unit fraction

4. (b) Proper fraction

5. $4\frac{2}{5} = \frac{5 \times 4 + 2}{5} = \frac{20+2}{5} = \frac{22}{5}$ (d) $\frac{22}{5}$

6. $\frac{36}{7} =$

$$\begin{array}{r} 5 \\ 7\overline{)36} \\ -\,35 \\ \hline 01 \end{array}$$

$= 5\frac{1}{7}$ (c) $5\frac{1}{7}$

7. $\frac{15}{14}, \frac{15}{8}, \frac{15}{13}, \frac{15}{16}$ (When fractions have same numerator, the one with smaller denominator are greater: Here $16 > 13 > 14 > 8$, hence.)

(b) $\frac{15}{16} < \frac{15}{14} < \frac{15}{13} < \frac{15}{8}$

8. $\frac{15}{35} = \frac{15 \div 5}{35 \div 5} = \frac{3}{7}, \frac{3 \times 6}{7 \times 6} = \frac{18}{42}$ (a) $\frac{18}{42}$

(HCF of 15 & 35 is 5)

2	15, 35
	3, 7

HCF = 7

9. $\frac{1}{5} + \frac{3}{10} + \frac{7}{20}$ (LCM of 5, 10 and 20 is 20)

2	5, 10, 20
2	5, 5, 10
5	5, 5, 5
	1, 1, 1

LCM = $2 \times 2 \times 5$

$= 20$

$\frac{1 \times 4}{5 \times 4} = \frac{4}{20}, \frac{3 \times 2}{10 \times 2} = \frac{6}{20}, \frac{7 \times 1}{20 \times 1} = \frac{7}{20}$

$\frac{4}{20} + \frac{6}{20} + \frac{7}{20} = \frac{4 + 6 + 7}{5} = \frac{17}{20}$

(c) $\frac{17}{20}$

10. $3 - \left(\frac{1}{4} + \frac{3}{4}\right) = 3 - \left(\frac{1 + 3}{4}\right), 3 - \left(\frac{4}{4}\right),$

$3 - 1 = 2$

Answer: (b) 2

11. $\frac{3}{4} = \frac{\text{Numbers of equal shaded portions}}{\text{Total numbers of portions}}$

(d) 

12. First 20 positive integers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 = 20

Number of prime numbers in first 20 Positive integer: 2, 3, 5, 7, 11, 13, 17 and 19 = 8

Fraction fo numbers of prime numbers in the first

$20 \text{ Positive integers} = \frac{\text{Number of Prime Numbers}}{\text{Numbers of positive int}}$

$= \frac{8}{20}$

HCF of 8 and 20 is 4

2	8, 20
2	4, 20
	2, 5

HCF = $2 \times 2 = 4$

$\frac{8}{20} = \frac{8 \div 4}{20 \div 4} = \frac{2}{5}$ (c) $\frac{2}{5}$

13. Degree of straight angle = 180°

Degree of right angle 90°

Degree of straight angle in a right angle = Degree of right angle ÷ Degree of straigh angle

$\frac{90}{180} = \frac{90 \div 90}{180 \div 90} = \frac{1}{2}$ (a) $\frac{1}{2}$

(HCF of 90 and 180 is 90)

2	90, 180
3	45, 90
3	15, 30
5	5, 10
	1, 2

HCF = $2 \times 3 \times 3 \times 5 = 90$

14. $\frac{11}{15} = \frac{5}{75}$

Since $15 \times 5 = 75$, so multiply 11×5

i.e $= \frac{11 \times 5}{15 \times 5} = \frac{55}{75}$

* = 55 (d) 55

15. Number of hours in a day: 24 hours

Number of hours food remains in the stomach = 4 hours

Fraction of a day food remains in the stomach:

$\frac{\text{Number of hours food remains in the stomach}}{\text{Number of hours in a day}}$

4	24, 4
	8, 1

$\frac{4}{24}$ hours $= \frac{4 \div 4}{24 \div 4} = \frac{1}{6}$ (d) $\frac{1}{6}$

Check your Progress

1. 3

2. $\frac{5}{11} > \frac{5}{13}$ (When, fraction have same numerator, the one with smaller denominator is greater), 11 < 13, 11 is smaller than 18 hence, $\frac{5}{11}$ is greater than $\frac{5}{13}$

3. $\frac{16}{17} < \frac{16}{15}$ (When, fraction have same numerator, the one with smaller denominator is greater) 17 > 15, 17 is smaller than 15 hence, $\frac{16}{17}$ is smaller than $\frac{16}{15}$)

4. Equilvalent fraction of $\frac{2}{7}$ with denominator 21.

$\frac{2 \times 3}{7 \times 3} = \frac{6}{21}$ (In order or get 21 as denominator 7 should be multiplied by 3, since denominator is multiplied by 3, then the numerator will aso be multiplied by 3)

5. $\frac{2}{7}, \frac{10}{35}$ (Cross multiplying)

$\frac{2}{7} \times \frac{10}{35}$: $2 \times 35 = 10 \times 7 = 70 = 70$

$= 70 = 70$

Yes, $\frac{2}{7}$ and $\frac{10}{35}$ are equivalent fractions.

6. No, 32 and 64 are not in their lowest term, because they have common factor other than 1.

Factor of 32: (1), (2), (4), (8), (16) and (32)

Factor of 64: (1), (2), (4), (8), (16), (32) and 64

Common factors other than 1: 2, 4, 8, 16 and 32.

7. $\frac{2}{5} + \frac{3}{5} + \frac{4}{5} + \frac{5}{5} = \frac{2 + 3 + 4 + 5}{5}$

$= \frac{14}{5}$

8. $1 - \left(\frac{1}{4} + \frac{1}{4}\right)$

$= 1 - \left(\frac{1 + 1}{4}\right)$

$\frac{1}{1} - \frac{2}{4}$ (LCM of 1 and 4 is 4)

$\frac{1 \times 4}{1 \times 4} = \frac{4}{4}, \frac{2 \times 1}{4 \times 1} = \frac{2}{4}$

$\frac{4}{4} - \frac{2}{4} = \frac{4 - 2}{4} = \frac{2}{4}$

9. Number $\frac{25}{25}$ is not and improper fraction as both numerator and denominator are equal and in an improper fraction numerator is bigger than denominator.

10. $\frac{16}{7} = 2\frac{2}{7}$

$7\overline{)16}\ (2$

-14

2

Challenge

$\left(2\frac{1}{4} + 9\frac{1}{8}\right) - \left(4\frac{3}{4} + 5\frac{1}{2}\right)$

$2\frac{1}{4} = \frac{4 \times 2 + 1}{4} = \frac{8 + 1}{4} = \frac{9}{4}$

$4\frac{3}{4} = \frac{4 \times 4 + 3}{4} = \frac{16 + 3}{4} = \frac{19}{4}$

$9\frac{1}{8} = \frac{8 \times 9 + 1}{8} = \frac{72 + 1}{8} = \frac{73}{8}$

$5\frac{1}{2} = \frac{2 \times 5 + 1}{2} = \frac{10 + 1}{2} = \frac{11}{2}$

$\left(\frac{9}{4} + \frac{73}{8}\right) - \left(\frac{19}{4} + \frac{11}{2}\right)$

LCM of 4 and 8 is 8

LCM of 4 and 2 is 4

2	4, 8
2	2, 4
2	2, 2
	1, 1

2	4, 5
2	2, 5
5	1, 5
	1, 1

$= 2 \times 2 \times 2$ $= 2 \times 2 \times 5$

$= 8$ $= 20$

$$\left(\frac{9 \times 2}{4 \times 2} + \frac{73 \times 1}{8 \times 1}\right) - \left(\frac{19 \times 1}{4 \times 1} + \frac{11 \times 2}{5 \times 2}\right)$$

$$\left(\frac{18}{8} + \frac{73}{8}\right) - \left(\frac{19}{4} + \frac{22}{2}\right)$$

$$\left(\frac{18}{8} + \frac{73}{8}\right) - \left(\frac{19 + 22}{4}\right)$$

$$\left(\frac{18}{8} + \frac{73}{8}\right) - \left(\frac{41}{4}\right)$$

$$\frac{18}{8} + \frac{73}{8} - \left(\frac{41}{4}\right)$$

$$\frac{18 \times 1}{18 \times 1} + \frac{73 \times 1}{8 \times 1} - \frac{41 \times 2}{4 \times 2}$$

LCM of 4 and 8 is 8

$$\frac{18}{8} + \frac{73}{8} - \frac{82}{8} = \frac{18 + 73 - 82}{8} = \frac{91 + 82}{8}$$

$$= \frac{9}{8} = 1\frac{8}{8}$$

8 Decimals

Exercise 8.1

1.

	Decimal numbers	Thousands (1000)	Hundreds (100)	Tens (10)	Ones	.	Tenths $\frac{1}{10}$	Hundreds $\frac{1}{100}$	Thousands $\frac{1}{1000}$
(a)	4375. 756	4	3	7	5	.	7	5	6
(b)	0.009				0	.	0	0	9
(c)	15. 06			1	5	.	0	6	
(d)	74. 059			7	4	.	0	5	9

2. (a) 276.05: $200 + 70 + 6 + 0 + \frac{5}{100} = 200 + 70 + 6 + 0.0 + 0.05$: Two hundred seventy six point zero five.

(b) 0.29: $0 + \frac{2}{10} + \frac{9}{100} = 0 + 0.2 + 0.09$: Zero point two nine.

(c) 8.005: $8 + \frac{0}{10} + \frac{0}{100} + \frac{5}{1000} = 8 + 0.0 + 0.00 + 0.005$: Eight point zero zero five.

(d) $0.459 + 0 + \frac{4}{10} + \frac{5}{100} + \frac{9}{1000} = 0 + 0.4 + 0.05 + 0.009$: Zero point four five nine

3. (a) $40 + 5 + \frac{2}{10} + \frac{1}{1000} = 40 + 5 + 0.2 + 0.001 = 45.201$

(b) $5000 + 400 + 30 + 2 + \frac{1}{10} + \frac{2}{100} = 5000 + 400 + 30 + 2 + 0.1 + 0.02 = 5432.12$

(c) $274 + \frac{7}{1000} = 274 + 0.007 = 274.007$

(d) $30 + 3 + \frac{7}{10} + \frac{3}{100} + \frac{5}{1000} = 33.735$

4. (a) $7 + \frac{4}{10} = 7 + 0.4 = 7.4$

(b) $12 + \frac{5}{100} = 12 + 0.005 = 12.05$

(c) 60.756

(d) 235.06

5. (a) 17 and 3 hundreths

(b) 9 and 236 thousandths

(c) 79 and 6 hundreths

(d) 1 and 3 tenths

(e) 27 and 3 hundreths

(f) 0 and 6 ten thousandths

(g) 0 and 7 thousandths

(h) 3 and 60 hundreths

6. (a) 36.07

(b) 24.395

(c) 3000. 8

(d) 16. 102

(e) 29.007

(f) 68.5

(g) 2600.04

(h) 21304.07

Exercise 8.2

1. (a) 6.**0**6 < 6.**6** (6 > 0)

(b) **0**.74 < **7**.4 (0 < 7)

(c) 60.**0**3 < 60.**3**0

(d) 0.436 = 0.4360 (0 doesn't hold any value at the end of a decimal place)

(e) 3**2**.7 < 3**3**.3 (2<3)

(f) 34.6 (=) 34.60 (0 doesn't hold any value at the end of a decimal place)

(g) 3.**7**3 (>) 3.**6**3 (7 > 6)

(h) 6.**0**4 (<) 6.**4**0

(i) 11.**4**0 (>) 11.**0**4

3. (a) Decimal fraction: 43.800

Decimal places: 3

Numerator: 43800

Denominator: 100

Fraction: $\frac{43800}{1000}$

$\therefore 4.3800 = \frac{43800}{1000} = \frac{219}{5} = 43\frac{4}{5}$

(b) Decimal fraction: 0.005

Decimal places: 3

Numerator: 0005

Denominator: 1000

Fraction: $\frac{0005}{1000}$

$\therefore 0.005 = \frac{0005}{1000} = \frac{0005}{1000} = \frac{0001}{200}$

(c) Decimal fraction: 0.8

Decimal places: 1

Numerator: 08

Denominator: 10

Fraction: $\frac{08}{10}$

$\therefore 0.8 = \frac{8}{10} = \frac{4}{5}$

(d) Decimal fraction: 1.25

Decimal places: 2

Numerator: 125

Denominator: 100

Fraction: $\frac{125}{100}$

$\therefore 1.25 = \frac{125}{100} = \frac{5}{4} = 1\frac{1}{4}$

(e) Decimal fraction: 1.66

Decimal places: 2

Numerator: 166

Denominator: 100

Fraction: $\frac{166}{100}$

$\therefore 1.66 = \frac{166}{100} = \frac{83}{50} = 1\frac{33}{50}$

(f) Decimal fraction: 7.4

Decimal places: 1

Numerator: 74

Denominator: 10

Fraction: $\frac{74}{10}$

$\therefore 7.4 = \frac{74}{10} = \frac{37}{5} = 7\frac{2}{5}$

(g) Decimal fraction: 0.036

Decimal places: 3

Numerator: 0036

Denominator: 100

Fraction: $\frac{0036}{1000}$

$\therefore 0.036 = \frac{0036}{1000} = \frac{9}{250}$

(h) Decimal fraction: 0125

Decimal places: 3

Numerator: 0125

Denominator: 1000

Fraction: $\frac{0125}{1000}$

$\therefore 0.125 = \frac{0125}{1000} = \frac{1}{8}$

(i) Decimal fraction: 3.784

Decimal places: 3

Numerator: 3784

Denominator: 1000

Fraction: $\frac{3784}{1000}$

$\therefore 3.784 = \frac{3784}{1000} = \frac{473}{125} = 21\frac{13}{50}$

(j) Decimal fraction: 21.26

Decimal places: 2

Numerator: 2126

Denominator: 100

Fraction: $\frac{2126}{100}$

$\therefore 21.26 = \frac{2126}{100} = \frac{1063}{50} = 21\frac{13}{50}$

4. (a) $\frac{7}{10}$: Numbers of zeros = 1
= 0.7

(b) $\frac{1111}{10}$: Numbers of zeros = 1
= 111.1

(c) $\frac{146}{10}$: Numbers of zeros = 1
= 14.6

(d) $\frac{13}{10}$: Numbers of zeros = 1
= 1.3

(e) $\frac{51}{100}$: Numbers of zeros = 2
= 0.51

(f) $\frac{675}{100}$: Numbers of zeros = 2
= 6.75

(g) $\frac{9}{1000}$: Numbers of zeros = 3
= 0.009

(h) $\frac{4953}{1000}$: Numbers of zeros = 3
= 4.953

(i) $\frac{70}{1000}$: Numbers of zeros = 3
= 0.070

(j) $\frac{37}{1000}$ = Numbers of zeros = 4
= 0.0037

5. (a) $\frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{8}{10}$
Numbers of zeros = 1
= 0.8

(b) $\frac{7}{4} = \frac{7 \times 25}{4 \times 25} = \frac{175}{100}$
= 1.75

(c) $\frac{123}{30} = \frac{123 \div 3}{30 \div 3} = \frac{41}{10}$
Numbers of zeros = 1
= 4.1

(d) $\frac{13}{20} = \frac{13 \times 5}{20 \times 5} = \frac{65}{100}$
Numbers of zeros = 2
= 0.65

(e) $\frac{19}{25} = \frac{19 \times 4}{25 \times 4} = \frac{76}{100}$
Numbers of zeros = 2
= 0.76

(f) $\frac{65}{40} = \frac{65 \times 25}{40 \times 25} = \frac{1625}{1000}$
Numbers of zeros = 3
= 1.625

(g) $\frac{33}{50} = \frac{33 \times 2}{50 \times 2} = \frac{66}{100}$
Numbers of zeros = 2
= 0.66

(h) $\frac{41}{50} = \frac{41 \times 2}{500 \times 2} = \frac{82}{1000}$
Numbers of zeros = 3
= 0.082

(i) $\frac{8}{125} = \frac{8 \times 8}{125 \times 8} = \frac{64}{1000}$
Numbers of zeros = 3
= 0.064

(j) $\frac{96}{125} = \frac{96 \times 8}{125 \times 8} = \frac{768}{1000}$
Numbers of zeros = 3
= 0.768

6. (a)
$$4\overline{)10}\quad 0.25,\ -8,\ 20,\ -20,\ 0$$
$$\frac{1}{4} = 0.25$$

(b)
$$8\overline{)10}\quad 0.125,\ -8,\ 20,\ -16,\ 40,\ -40,\ 0$$
$$\frac{10}{8} = 0.125$$

(c)
$$4\overline{)30}\quad 0.6,\ -30,\ 0$$
$$\frac{3}{5} = 0.6$$

(d)
$$16\overline{)50}\quad 0.315,\ -48,\ 20,\ -16,\ 40,\ -40,\ 0$$
$$\frac{5}{16} = 0.315$$

(e)
$$8\overline{)70}\quad 0.875,\ -64,\ 60,\ -56,\ 40,\ -40,\ 0$$
$$\frac{7}{8} = 0.875$$

(f) $1\frac{1}{4} = \frac{4 \times 1 + 1}{4} = \frac{4 + 1}{4} = \frac{5}{4} = 1.25$

$$4\overline{)5}\quad 1.25,\ -4,\ 10,\ -8,\ 20,\ -20,\ 0$$

(g) $3\frac{4}{5} = \frac{5 \times 3 + 4}{5} = \frac{15 + 4}{5} = \frac{19}{5}$

$$5\overline{)19}\quad 3.8,\ -15,\ 40,\ -40,\ 0$$
$$3\frac{4}{5} = 3.8$$

(h) $5\frac{2}{5} = \frac{5 \times 5 + 2}{5} = \frac{25 + 1}{5} = \frac{27}{5}$

$$5\overline{)27}\quad 5.4,\ -25,\ 20,\ -20,\ 0$$
$$\frac{27}{5} = 5.4$$

(i) $13\frac{13}{40} = \frac{40 \times 13 + 13}{40} = \frac{520 + 13}{40} = \frac{533}{40}$

$$40\overline{)533}\quad 13.325,\ -40\downarrow,\ 133,\ -120,\ 130,\ -120,\ 100,\ -80,\ 200,\ -200,\ 0$$
$$13\frac{13}{40} = 13.325$$

(j) $23\frac{3}{8} = \frac{8 \times 23 + 3}{8} = \frac{184 + 3}{8} = \frac{187}{8}$

$$
\begin{array}{r}
23.375 \\
8\overline{)\,187} \\
-\,16\downarrow \\
\hline
27 \\
-\,24 \\
\hline
30 \\
-\,24 \\
\hline
60 \\
-\,56 \\
\hline
40 \\
-\,40 \\
\hline
0
\end{array}
$$

$23\frac{3}{8} = 23.375$

Exercise 8.3

1. (a)
$$
\begin{array}{r}
5.16 \\
+\,3.24 \\
\hline
8.40
\end{array}
$$

(b)
$$
\begin{array}{r}
0.7 \\
+\,0.9 \\
\hline
1.6
\end{array}
$$

(c) 67 = 67.000

$$
\begin{array}{r}
67.000 \\
+\;\;3.751 \\
\hline
70.751
\end{array}
$$

(d)
$$
\begin{array}{r}
6.5 \\
+\,4.8 \\
\hline
11.3
\end{array}
$$

(e)
$$
\begin{array}{r}
2.165 \\
+\,3.278 \\
\hline
5.443
\end{array}
$$

(f)
$$
\begin{array}{r}
14.354 \\
+\;\;9.109 \\
\hline
23.463
\end{array}
$$

(g)
$$
\begin{array}{r}
3\;\;8\;1 \\
3.17 \\
+\,4.36 \\
\hline
11.34
\end{array}
$$

(h) 601.3 = 601.30

$$
\begin{array}{r}
601.30 \\
+\,108.91 \\
\hline
710.21
\end{array}
$$

(i) 1 = 1.0

$$
\begin{array}{r}
1.0 \\
+\,0.3 \\
\hline
1.3
\end{array}
$$

(j) 71.29 = 71.290

88.8 = 88.800

$$
\begin{array}{r}
\;\;\;\;\mathbf{1}\;\;\;\;\; \\
71.290 \\
88.800 \\
+\;\;\;1.369 \\
\hline
161.559
\end{array}
$$

(k) 1.6 = 1.60

7 = 7.00

$$
\begin{array}{r}
4.11 \\
1.60 \\
+\,7.00 \\
\hline
12.71
\end{array}
$$

(l)
$$
\begin{array}{r}
\;\;\;\;3.2 \\
+\,354.1 \\
\hline
357.3
\end{array}
$$

2. (a)
$$
\begin{array}{r}
7.77 \\
-\,3.33 \\
\hline
4.44
\end{array}
$$

(b)
$$
\begin{array}{r}
8.54 \\
-\,6.01 \\
\hline
2.53
\end{array}
$$

(c)
$$\begin{array}{r} 8.26 \\ -\ 3.88 \\ \hline 4.38 \end{array}$$

(d)
$$\begin{array}{r} 17.60 \\ -\ \ 4.69 \\ \hline 12.91 \end{array}$$

(e) $3 = 3.000$
$$\begin{array}{r} 3.000 \\ -\ 1.013 \\ \hline 1.987 \end{array}$$

(f)
$$\begin{array}{r} 11.111 \\ -\ \ 1.111 \\ \hline 10.000 \end{array}$$

(g) $21.26 = 21.260$
$$\begin{array}{r} 28.674 \\ -\ 21.260 \\ \hline 07.414 \end{array}$$

(h)
$$\begin{array}{r} 34.170 \\ -\ 27.717 \\ \hline 06.453 \end{array}$$

(i)
$$\begin{array}{r} 53.100 \\ -\ 35.111 \\ \hline 17.989 \end{array}$$

(j) $7 = 7.000$
$$\begin{array}{r} 7.000 \\ -\ 0.467 \\ \hline 6.533 \end{array}$$

(k) $100 = 100.00$
$$\begin{array}{r} 100.00 \\ -\ \ 69.66 \\ \hline 030.31 \end{array}$$

(l) $436.2 = 436.200$
$$\begin{array}{r} 436.200 \\ -\ 364.123 \\ \hline 072.077 \end{array}$$

3. (a) $4.5 + 5 - 6.4$
$= 9.5 - 6.4$
$= 3.1$

(b) $2.8 + 1.1 - 2.9$
$= 3.9 - 2.9$
$= 1$

(c) $3 - 3.3 + 1.8$
$= 0.3 + 1.8$
$= 1.5$

(d) $3.28 + 1.63 - 4.9$
$= 4.91 - 4.90$
$= 0.01$

(e) $2.36 - 3.24 + 2.18$
$= 0.88 + 2.18$
$= 1.30$

(f) $6.7 + 3.21 - 7.463$
$= 6.700 + 3.210 - 7.463$
$9.910 - 7.463$
$= 2.477$

(g) $48.93 + 50.05 + 10.007$
$48.930 + 50.050 + 10.007$
$98.980 + 10.007$
$= 108.987$

(h) $63.368 + 21.732 - 35.1$
$63.368 + 21.732 - 35.100$
$85.100 - 35.100$
$= 50.000$

(i) $2.67 - 1.787 + 1.878$
$2.670 - 1.787 + 1.878$
$= 0.883 + 1.878$
$= 2.761$

(j) $101.28 + 29.17 - 30.27$
$130.47 - 30.27$
$= 100.20$

(k) $43.16 + 493.28 - 506.44$
$536.44 - 50.64$
$= 30$

(l) $2916 - 14.68 - 307.148 + 30.228$
$291.600 - 14.680 - 307.148 + 30.228$
$276.\ 92 - 307.148 + 30.228$
$= -30.228 + 30.228 = 0$

4. 5.248 should be subtracted from 7 to get the number that should be added in 5.248 to make it 7.
$$\begin{array}{r} 7.000 \\ -\ 5.248 \\ \hline 1.752 \end{array}$$

7 – 5.248

7.000 – 5.248

= 1.752

Answer: 1.752 should be added in 5.248 to make it 7.

5. 2.14 – 1.026

2.140 – 1.026

=1.114

$$\begin{array}{r} 2.140 \\ -\ 1.026 \\ \hline 1.114 \end{array}$$

$$\begin{array}{r} 8.000 \\ -\ 1.114 \\ \hline 6.886 \end{array}$$

Answer: 6.886 should be added to the difference of 2.14

6. (15.27 + 9.76) – (15.27 – 9.76)

25.03 – 5.51

= 19.52

$$\begin{array}{r} 15.27 \\ +\ 9.76 \\ \hline 25.03 \end{array} \qquad \begin{array}{r} 15.27 \\ -\ 9.76 \\ \hline 5.51 \end{array} \qquad \begin{array}{r} 25.03 \\ +\ 5.51 \\ \hline 19.52 \end{array}$$

The sum of 15.52 and 9.76 is greater than its difference by 19.52.

7. (714 + 417.67) – (714 – 417.67)

= (714.00 + 417.67) – (714.00 – 417.67)

= 1131.67 – 296.33

= 835.34

$$\begin{array}{r} 714.00 \\ +\ 417.67 \\ \hline 1131.67 \end{array} \qquad \begin{array}{r} 714.00 \\ -\ 417.67 \\ \hline 296.33 \end{array}$$

$$\begin{array}{r} 1131.67 \\ -\ 296.33 \\ \hline 835.34 \end{array}$$

Exercise 8.4

1. (a) ₹9 into paise

₹1 = 100 paise

₹9 = (9 × 100)p

= 900p

(b) ₹17.25 in paise

₹1 = 100 paise

₹17.25 = (17.25 × 100)p

= 1725p

(c) ₹0.85 into p

₹1 = 100 paise

₹0.85 = (0.85 × 100)p

= 85p

(d) ₹0.15 into paise

₹1 = 100 paise

₹0.15 = (0.15 × 100)p

= 15p

(e) ₹7.08 into paise

₹1 = 100 paise

₹7.08 = (7.08 × 100)p

= 708p

(f) ₹38 into p

₹1 = 100 paise

₹38 = (38 × 100)p

= 3800p

2. (a) 9 paise into ₹

1 paise = ₹$\frac{1}{100}$

9p = ₹$\frac{9}{100}$ = ₹0.09

(b) 65 paise into ₹

1 paise = ₹$\frac{1}{100}$

65p = ₹$\frac{65}{100}$

= ₹0.65

(c) 600 paise into ₹

1 paise = ₹$\frac{1}{100}$

600p = ₹$\frac{600}{100}$

= ₹6

(d) 645 paise into ₹

1 paise = ₹$\frac{1}{100}$

645p = ₹$\frac{645}{100}$

= ₹6.45

(e) 7005 paise into ₹

1 paise = ₹$\frac{1}{100}$

7005p = $\frac{7005}{100}$

= ₹7005

(f) 775p = ₹$\frac{775}{100}$

1 paise = ₹$\frac{1}{100}$

= ₹7.75

3. (a) 8 cm into mm

1cm = 10mm

8cm = (8 × 10)mm

= 80mm

(b) 7.5 cm into mm

1cm = 10mm

7.5cm (7.5 × 10)mm

= 75mm

(c) 11m into mm

1m = 100mm

11m = (11 × 100)m

= 1100m

(d) 9.76m into mm

1m = 100mm

9.76m = (9.76 × 1000)mm

= 9760mm

(e) 5.745m into mm

1m = 1000mm

5.745m = (5.745 × 1000)mm

= 5745mm

(f) 45.8cm into mm

1cm = 10mm

45.8cm = (45.8 × 10)mm

= 458mm

4. (a) 38cm into m

1cm = $\frac{1}{100}$m

38cm = $\frac{38}{100}$m

= 0.38m

(b) 15cm into m

1cm = $\frac{1}{100}$m

15cm = $\frac{15}{100}$m

= 0.15m

(c) 400cm into m

1cm = $\frac{1}{100}$m

400cm = $\frac{400}{100}$

= 4m

(d) 740mm into m

1mm = $\frac{1}{1000}$m

740mm = $\frac{740}{1000}$m

= 0.740m

(e) 8765mm into m

1mm = $\frac{1}{1000}$m

8765mm = $\frac{8765}{1000}$

= 8.765m

(f) 2458cm into m

1cm = $\frac{1}{100}$cm

2458cm = $\frac{2458}{100}$m

= 24.58m

(g) 4km into m

1km = 1000m

4km = (4 × 1000)m

= 4000m

(h) 7.8km into m

1km = 1000m

7.8km = (7.8 × 1000)m

= 7800mm

5. (a) 8mm into cm

$1mm = \frac{1}{10}cm$

$8mm = \frac{8}{10}cm$

= 0.8cm

(b) 48mm into m

$1mm = \frac{1}{10}$

$48mm = \frac{48}{10}cm$

= 4.8cm

(c) 564mm into cm

$1mm = \frac{1}{10}cm$

$564mm = \frac{564}{100}$

= 56.4mm

(d) 7m into cm

1m = 100cm

7m = (7 × 100)cm

= 700cm

(e) 6.8m into cm

1m = 100cm

6.8m = (6.8 × 100)cm

= 680cm

(f) 23.35m into cm

1m = 100cm

23.35m = (23.35 × 100)cm

= 2335cm

6. (a) 18g into kg

$1g = \frac{1}{1000}kg$

$18g = \frac{18}{1000}kg$

= 0.018kg

(b) 64g into kg

$1g = \frac{1}{1000}kg$

$64g = \frac{64}{1000}kg$

= 0.064kg

(c) 746g into kg

$1g = \frac{1}{1000}kg$

$746g = \frac{746}{1000}kg$

= 0.7046kg

(d) 4000g into kg

$1g = \frac{1}{1000}kg$

$4000g = \frac{4000}{1000}kg$

= 4kg

(e) 7428g into kg

$1g = \frac{1}{1000}kg$

$7428g = \frac{7428}{1000}kg$

= 7.428kg

(f) 5018g into kg

$1g = \frac{1}{1000}kg$

$5018g = \frac{5018}{1000}kg$

= 5.018kg

7. (a) 0.015kg into g

1kg = 1000g

0.115kg = (0.015 × 1000)g

= 15g

(b) 6kg into g

1kg = 1000g

6kg = (6 × 1000)g

= 6000g

(c) 0.076kg into g

1kg = 1000g

0.076kg = (0.076 × 1000)g

= 76g

(d) 0.695kg into g

1kg = 1000g

0.695kg = (0.695 × 1000)g

= 695g

(e) 3.67kg into g

1kg = 1000g

3.67kg = (3.67 × 1000)g

= 3670g

(f) 11.04kg into g

1kg = 1000g

11.04kg = (11.04 × 1000)g

= 11040g

8. Cost of shirt: ₹355.50

Cost of Shoes: ₹536.25

Total cost: Cost of shirt + cost of shoes

	₹
	3 5 5 . 5 0
+	5 3 6 . 2 5
	8 9 1 . 7 5

= ₹355.50 + ₹536.25

= ₹891.75

Answer: Total cost of both shirt shoes is ₹891.75

9. Cost of book: ₹67.40

Amount paid: ₹100

Amount will be returned = Amount paid – Cost of book

	₹
	1 0 0 . 0 0
–	6 7 . 4 0
	0 3 2 . 6 0

= ₹100 – ₹67.40

= ₹100.00 – ₹67.40

= ₹32.60

Answer: Change of ₹32.60 will be returned.

10. Length of ribbon: 7.37m

Length of cutted piece: 2.78m

Length of cutted piece left: Length of ribbon – Length of cutted piece

	m
	7 . 3 7
–	2 . 7 8
	4 . 5 9

= (7.37 – 2.78)m

= 4.59m

Length between two hooks: 6m

6m > 4.59

Length between hooks > Length of ribbon.

	m
	6 . 0 0
–	4 . 5 9
	1 . 4 1

Length of ribbon more required: (6 – 4.59)m

= 1.41m

Hence, 1.41m of more riboon is required to tie the hooks which are 6m apart

11. Weight of Oranges: 2.650kg

Weigth of Apples: 1.375kg

Total weight of the fruits together: Weigth of Oranges + Weigth of Apples

= (2.650 + 1.355)kg

= 4.025kg

Answer: Total weight of the fruits together is 4.025kg.

12. Total Weight of sugar: 0.875kg (1kg = 1000g) (0.875kg = (0.875 × 1000)g = 875g)

Sugar used for making sweet dish: 437g

Sugar left in the packet: Total sugar – Sugar used

	g
	8 7 5
–	4 3 7
	4 3 8

= (875 – 437)

= 438g

Answer: 438g of sugar is left in the packet.

Review Exercise

1. (a) 23.083: $20 + 3 + \frac{0}{10} + \frac{8}{100} + \frac{3}{1000} = 20 + 3 + 0.0 + 0.08 + 0.003$; Twenty three point zero Eighty-three

(b) 0.498: $0 + \frac{4}{10} + \frac{9}{100} + \frac{8}{100} = 0 + 0.4 + 0.09 + 0.008$; Zero point four nine eight

(c) 407.0406: $400 + 0 + 7 + \frac{0}{10} + \frac{4}{100} + \frac{0}{1000} + \frac{6}{10000} = 400 + 0 + 7 + 0.0 + 0.04 + 0.000 + 0.0006$; Four hundred seven point zero four zero six.

(d) 246.0438: $200 + 40 + 6 + \frac{0}{10} + \frac{4}{100} + \frac{3}{1000} + \frac{8}{10000} = 200 + 40 + 60 + 0.0 + 0.04 + 0.003 + 0.0008$ = Two hundred forty six point zero four three eight.

2. (a) 6.250 , 0.153, 2.65, 10.690

Converting in like decimals: **6**.250, **0**.153, **2**.650, **10**.6910 (0 < 2 < 6 < 10)

0.153 < **2**.650 < **6**.250 < **10**.690

(b) 5.125, 5.210, 16.005, 5.012 (0 < 1 < 2) (5.012 > 5.125 > 5.210

5.**0**12 < 5.**1**25 < 5.**2**10 < **16**.005 [16 > 5]

(c) 10.009, 8.625, 10.002, 8.256 (8.**6**25 > 8.**2**56) (6 > 2) (8 < 10)

= 8.256 < 8.625 < 10.002 < 10.009

(10.00**9** > 10.00**2**)

(9 > 2)

3. (a) 0.42, 0.142, 2.501, 2.105

Converting into like decimals

= 0.420, 0.142, 2.501, 2.105

2.501 > 2.105 > 0.420 > 0.142

= 2.501 > 2.105 > 0.42 > 0.142

(b) 210.16, 21.016, 2.1016, 0.210

Converting into like decimals

210.1600, 21.0160, 2.1016 > 0.2100

210.16 > 21.016 > 2.1016 > 0.210

(c) 51.823, 12.82, 15.82, 10.82

Converting into like decimals

51.823, 12.820, 15.820, 10.820

51.823 > 15.820 > 12.823 > 10.820

51.823 > 15.82 > 12.82 > 10.82

4. (a) Decimal fraction: 0.78

Decimal places: 2

Numerator = 078

Denominator = 100

Fraction = $\frac{78}{100}$

$\therefore 0.78 = \frac{78}{100} = \frac{39}{50}$

(b) Decimal fraction = 7.256

Decimal places = 3

Numerator = 7256

Denominator = 1000

Fraction = $\frac{7256}{1000}$

$\therefore 7.256 = \frac{7256}{1000} = \frac{907}{125} = 7\frac{32}{125}$

(c) Decimal fraction: 14.6

Decimal places = 1

Numerator = 146

Denominator = 10

Fraction = $\frac{146}{10}$

$\therefore 146 = \frac{146}{10} = \frac{73}{5}$

(d) Decimal fraction: 38.078

Decimal places = 3

Numerator = 38078

Denominator = 3

Fraction = $\frac{38078}{1000}$

$\therefore 38.078 = \frac{38078}{1000} = \frac{19039}{500}$

5. (a)

$$\begin{array}{r} 0.75 \\ 4\overline{)\,30} \\ -\,28 \\ \hline 20 \\ -\,20 \\ \hline 0 \end{array}$$

$\frac{3}{4} = 0.75$

(b)

$$\begin{array}{r} 1.4 \\ 5\overline{)\,7} \\ -\,5 \\ \hline 20 \\ -\,20 \\ \hline 0 \end{array}$$

$\frac{7}{5} = 1.4$

(c) $5\frac{7}{8} = \frac{8 \times 5 + 7}{8} = \frac{40 + 7}{8} = \frac{47}{8}$

$$
\begin{array}{r}
5.875 \\
8\overline{)\,47} \\
-\,40 \\
\hline
70 \\
-\,64 \\
\hline
60 \\
-\,56 \\
\hline
40 \\
-\,40 \\
\hline
0 \\
\hline
\end{array}
$$

$\frac{47}{8} = 5.875$

(d) $17\frac{23}{25} = \frac{25 \times 17 + 23}{25} = \frac{425 + 23}{25} = \frac{448}{25}$

$$
\begin{array}{r}
17.92 \\
25\overline{)\,448} \\
-\,25\downarrow \\
\hline
198 \\
-\,175 \\
\hline
230 \\
-\,225 \\
\hline
50 \\
-\,50 \\
\hline
0 \\
\hline
\end{array}
$$

$\frac{448}{25} = 17.92$

6. (a) 5 + 0.05

Converting into like decimals

5.00 + 0.05

= 5.05

$$
\begin{array}{r}
5.00 \\
+\;0.05 \\
\hline
5.05 \\
\hline
\end{array}
$$

(b) 7.35 + 8.125

Converting into like decimals

= 7.350 + 8.125

= 15.475

$$
\begin{array}{r}
7.350 \\
+\;8.125 \\
\hline
15.475 \\
\hline
\end{array}
$$

(c) 0.169 + 5.023

= 5.192

$$
\begin{array}{r}
0.169 \\
+\;5.023 \\
\hline
5.192 \\
\hline
\end{array}
$$

(d) 75.32 + 64.56

$$
\begin{array}{r}
75.32 \\
+\;64.50 \\
\hline
139.88 \\
\hline
\end{array}
$$

(e) 3.09 + 80.32 + 6.135

Converting into like decimals

= 3.090 + 80.320 + 6.135

= 89.545

$$
\begin{array}{r}
3.090 \\
80.320 \\
+\;\;6.135 \\
\hline
89.545 \\
\hline
\end{array}
$$

(f) 10.69 + 0.08 + 97.86

= 108.61

$$
\begin{array}{r}
10.69 \\
0.08 \\
+\;97.86 \\
\hline
108.63 \\
\hline
\end{array}
$$

(g) 999.111 + 100.071 + 99.361

= 1198.543

$$
\begin{array}{r}
999.111 \\
100.071 \\
+\;\;99.361 \\
\hline
1198.543 \\
\hline
\end{array}
$$

7. (a) 0.07 – 0.12

= –0.05

(b) 12 – 6.76

Converting into like decimals

12.00 – 6.76

= 5.24

	1	2	.	0 0
–		6	.	7 6
		5	.	2 4

(c) 9.79 - 4.08 = 5.71

	9	.	7 9
–	4	.	0 8
	5	.	7 1

(d) 15.15 – 14.786

Converting into like decimals

15.150 – 14.786

= 00. 364

	1 5	.	1	5 0
–	1 4	.	7	8 6
	0 0	.	3	6 4

(e) 9.498 – 3.609 – 4.999 = 0.890

	9	.	4	9 8
–	3	.	6	0 9
	5	.	8	8 9

→

	5	.	8	8 9
–	4	.	9	9 9
	0	.	8	9 0

(f) 100.095 – 10.650 – 89.445 = 0

	1 0	0	.	0	9	5
–		1 0	.	6	5	0
	0 8	9	.	4	4	5

→

	8	9	.	4	4	5
–	8	9	.	4	4	5
	0	0	.	0	0	0

(g) 99.009 + 11.026 – 99.119 = 10.916

	9	9	.	0	0	9
–	1	1	.	0	2	6
1	1	0	.	0	3	5

→

	1	1	0	.	0	3 5
–		9	9	.	1	1 9
	0	1	0	.	9	1 6

8. Difference of 4.76 and the Sum of 7.98 and

	7	.	9 8
–	0	.	7 8
	8	.	7 6

→

	8	.	7 6
–	4	.	7 6
	4	.	0 0

9. Greatest 2-digit number: 99

Number that should be subtracted from 112.09 to get the greatest 2 digit number = Different of 112.09 and the greatest 2 digit number = 112.09 – 99

= 112.09 – 99.00

= 13.09

	1	1	2	.	0 9
–		9	9	.	0 0
		1	3	.	0 9

Answer: 13.09 should be subract from 112.09 to get greatest 2-digit number.

10. Sum of 47.38 and 117.47

Diffecence of 117.47 and 47.38

	4	7	.	3 8
+ 1	1	7	.	4 7
1	6	4	.	8 5

1	1	7	.	4 7
–	4	7	.	3 8
	7	0	.	0 9

Difference between their sum & Difference

1	6	4	.	8 5
–	7	0	.	0 9
0	9	4	.	7 6

Answer: The different of 47.38 and 117.47 is greater from their sum by 94.76.

Multiple Choice Questions

1. 5 hundreds 3 tenths = $\frac{500}{1} + \frac{3}{10}$

= 500 + 0.3

= 500.3

Answer: (d) 500.03

2. $200 + 5 + \frac{1}{1000} = 200 + 5 + 0.001$

= 205.001

Answer: (b) 205.001

3. $\frac{11}{5} = \frac{11 \times 2}{5 \times 2} = \frac{22}{10} = 2.2$ (c) 2.2

4. $0.625 = \frac{625}{1000} = \frac{625 \div 125}{1000 \div 125} = \frac{5}{8}$

Answer: (d) $\frac{5}{8}$

5. **Answer:** (a) 4 and 5

6. 0.**2**56 < 0.**5**26 < 0.**6**25 (2 < 5 < 6)

Answer: (c) 0.256 < 0.526 < 0.625

7. 1p = ₹$\frac{1}{100}$

8p = ₹$\frac{8}{100}$

₹15 and 8p = ₹100 $(15 + \frac{8}{100})$

= ₹15.08

Answer: (a) ₹15.08

8. 1km = $\frac{1}{1000}$km

888m = $\frac{888}{1000}$km

Answer: (d) 0.888km

9. 12.057kg = 12kg + 0.57kg

1kg = 1000g

0.57kg = (0.057 × 1000)g

= 57g

12kg + 0.057kg = 12kg + 57g

Hence, 12.057kg = 12kg 57g

Answer: (c) 12kg 57g

10.

	1	5	.	8	0	9
–		7	.	9	9	9
		7	.	8	1	0

or 7.81

Answer: (a) 7.81

11. **Answer:** (a) like decimals

12. **Answer:** (b) 0.002

13. **Answer:** (b) 0 &1

14. $\frac{75}{100}$ = 0.75 (Two zero after 1 represents inserting decimal point 2 place to the left in the numerator).

Answer: (b) 0.75

15. (d) P and Q both are false as writing zeros to the extreme right of the decimal part does not change the value of decimal fractions.

16. The shaded portion BOT represent $\frac{1}{4}$ of the square as a diagnol divides a square into 2 equal parts, i.e $\frac{1}{2}$ another diagnol disecting the first diagnol divides the square into 4 equal parts, is $\frac{1}{4}$.

$\frac{1}{4} = 4\overline{)10}$ = 0.25

$-\ 10$

0

Answer: (b) 0.25

17. 8.52 – 4.0468

Converting into like factions

8.5200 – 4.0468

= 4.4732

	8	.	5	2	0	0
–	4	.	0	4	6	8
	4	.	4	7	3	2

Answer: (a) 4.4732

18. 1ml = $\frac{1}{1000}l$

748ml = $\frac{748}{1000}l$

= 0.748l

Answer: (c) 0.748l

19. 0.7, 0.07

Converting into like fractions

= 0.**7**0, 0.**0**7 (7>0)

0.**7**0 > 0.**0**7

∴ 0.7 > 0.007

(b) 0.07

Check Your Progress

1. 11.007: Eleven point zero zero seven

2. 5 tenths = $\frac{5}{10}$ = 0.5

3. $\frac{5}{8}$ = 0.625

$8\overline{)50}$ = 0.625

$-\ 48$

20

$-\ 16$

40

$-\ 40$

0

4. 0.001

Decimal places: 3

Numerator: 0001

Denominator: 1000

Fractions: $\frac{1}{1000}$

5. $20.15 = 20 + 0 + \frac{1}{10} + \frac{5}{100}$

OR $20 + 0 + 0.1 + 0.05$

6. $7.5\mathbf{3}2 > 7.5\mathbf{2}3$ $(3 > 2)$

7. 1 paise = ₹$\frac{1}{100}$

₹21 and 8p = ₹$(21 + \frac{8}{100})$

=₹$(21 + 0.08)$

= ₹21.08

8. 1m = $\frac{1}{1000}$km

2075m = $\frac{2075}{1000}$ km = 2.075km

9. 1.256kg = 1 kg + 0.256kg

1kg = 1000g

1kg + 0.256kg = 1kg + (0.256×1000)g

= 1kg + 256g

= 1kg 256g

10. 0.3 + 0.33

Converting into like decimals

= 0.30 + 0.33

= 0.63

	0	.	3	0
+	0	.	3	3
	0	.	6	3

Challenge

Let the total food for the eaten is 1 and out these $\frac{1}{10}$ of the food eaten is turned into organism own body.

Now available for the next level of the consumber in a food chain is = $1 - \frac{1}{10} = \frac{10 - 1}{10} = \frac{9}{10}$

9 Data handling

Exercise 9.1

1.

Number of Children	Frequency
0	2
1	6
2	9
3	5
4	3

2.

Shoe sizes	Frequency
4	2
5	5
6	4
7	4
8	6
9	7

3.

Number	Frequency
1	5
2	7
3	6
4	2
5	3

4 .

Number	Frequency
5	2
6	4
7	7
8	5
9	5
10	2

5. (a) numerical figure

(b) Orignal

(c) Array

(d) Frequency

(e) tabulation

Exercise 9.2

1. (a) **Class XI** (1 picture = 100 books) (Total number of books read: Picture × 100

(Class XII = Class X < Class IX < Class XI)

[4 × 100 = 4 × 100 < 5 × 100 < 6 × 100]

[400 = 400 < 500 < 600]

(b) **Class IX** (1 picture = 100 books) (Total number of books read Picture × 100

(Class XII = Class X < Class IX < Class XI)

[4 × 100 = 4 × 100 < 5 × 100 < 6 × 100]

[400 = 400 < 500 < 600]

(c) Number of books read by Class XI

Number of books read by Class XII

= 600 – 400

= 200

∴ 200 more books are read by class XI studends than class XII students.

2. (a) 1 matches = 40 matchboxes, Total number of matchboxes: Number of matches × 40)

Total number of matchboxes collected: Matcboxes collected by (Taruna + Sapna + Kanika + Rahul)

= 60 × 40 + 5 × 40 + 7 × 40 + 4 × 40

= 240 + 200 + 280 + 160 = 880

Answer: Total 880 matchboxes were collected altogether.

(b) Number of matchboxes with Taruna: Number of matches × 40

(6 × 40) matchboxes = 240 matchboxes

(c) Rahul (Rahul < Sapna < Taruna < Kanika)

(160 < 200 < 240 < 280)

(d) Number of matches with sapna = 40 × 5 = 200

Number of matches with Rahul = 40 × 4 = 160

Number of matches with Sapna more than Rahul = 200 – 160

= 40

3. (a) Total investment of Mr. Vinay in his enterperise.

Book Shop + Utensis Shop + Fast food shop + Electric Shop

$= (1 + 1 + 1 + 1 + 1) + (1 + 1 + \frac{1}{2}) + (1 + 1) + (1 + 1 + 1 + 1 + \frac{1}{2})$

$= 5 + 2.5 + 2 + 4.5$

$= 14$

1  stands for 1 crore

So, 14  Stands for 14 × 1 crore = 14 crore

(b) Investment in untensils shop: $(1 + 1 + \frac{1}{2})$ crore = 2.5 crore

$2.5 + 2 = 4.5$

Investment in Electric shop = $(1 + 1 + 1 + 1 + \frac{1}{2})$ crore = 4.5 crore

Hence, Vinay has invested 2 crores more investment in Electric shop than in Utensils shop.

(c) Fast food shop + 3 crore = Investment in Book Shop

$(1 + 1) + 2 = (1 + 1 + 1 + 1 + 1)$

$(2 + 3)$ crore = 5 crore

5 crore = 5 crore, Hence, Vinay has invested 3 crores more in Book shop than in fast food shop.

(d) Total Investment = 14 crore

Investment in Fast Food shop = 2 crore

Fraction of whole investment in fast food shop

$= \frac{\text{Investment in fast food shop}}{\text{Total Investment}}$

$= \frac{2}{14} = \frac{1}{7}$

Hence, $\frac{1}{7}$ of total investment has been invested in fast food shop.

4. (a)

Wild Animals	
Lion	☺ × 5 + △△△
Cheetah	☺ × 14
Tiger	☺ × 10
Elephant	☺ × 16

Scale: 1☺ represent 5 animals and 1△ represent 1 animals.

(b)

Number of Books	
Maths	Book × 6
Science	Book × 5 + ▭▷ × 5
Social Science	Book × 3 + ▭ × 8 + ▭▷ × 9
English	Book × 6 + ▭ × 5
General Knowledge	Book × 2 + ▭ × 9 + ▭▷ × 8

Scale: Book = 1000 books

▭ = 100 books

▭▷ = 90 books

5.

Modes of Travelling	
Mode	Number of Studens
By walking	🧍 × 3
On Bicycle	🧍 × 5
By Car	🧍 × 1
By Bus	🧍 × 7

Scale: 🧍 = 10 students

6.

Day	Number of Absentes	
Monday	× 3	2 × 3 = 6
Tuesday	× 1	2 × 1 = 2
Wednesday	× 2	2 × 2 = 4
Thusday	× 1	2 × 1 = 2
Friday	× 4	2 × 4 = 8

Scale: = 2 absents

7.

Rooms.no	Number of stools	
6	× 3	10 × 3 = 30
2	× 4	10 × 4 = 40
4	× 6	10 × 6 = 60
2	× 5	10 × 5 = 50
8	× 2	10 × 2 = 20

Scale: = 10 Stools

8.

Subject	Number of Students	
English	× 3	15 ÷ 5 = 3
Mathmatics	× 5	25 ÷ 5 = 5
Hindi	× 2	10 ÷ 5 = 1
Drawing	× 4	20 ÷ 5 = 4

Scale: = 5 Succesful students

Exercise 9.3

1.

Mon	Tues	Wed	Thurs	Fri
10	15	12	20	15

2. (a) January

(b) (150 – 140) = 10

(c) 60

(d) November

3. (a) Total number of Students: Number of students in water park + Wildlife sanctuary + Hill station + Sea side

= (16 + 8 + 10 + 14) studens = 48 students.

(b) Water park

(c) Sea side

(d) 16

4. (a) Marks Scored in different subjects

(b) Science

(c) Mathematics

(d) Hindi & Mathematics

5. (a) Number of members in each family

(b) 10

(c) If couples hace no child that means they are a family of 2 = **5**

(d) Family with 4 members are the most common

6. (a) In 2nd week the production was maximum.

(b) In 4th week the production was minimum.

(c) Average Production: $\frac{\text{Total Production}}{\text{No of weeks}}$

$= \frac{\text{1st + 2nd + 3rd + 4th + 5th week}}{5} = \frac{600 + 1000 + 800 + 500 + 700}{5} = \frac{3600}{5}$

= **720**

(d) Total number of production in first three weeks

$= \frac{600 + 1000 + 800}{3} = \frac{2400}{3} = 800$

7. (a) Modes of transport used by students to go to school

(b) Bicycle

(c) 15

(d) Total number of students – Number of students who go with bus = 51 – 15 = 36 students

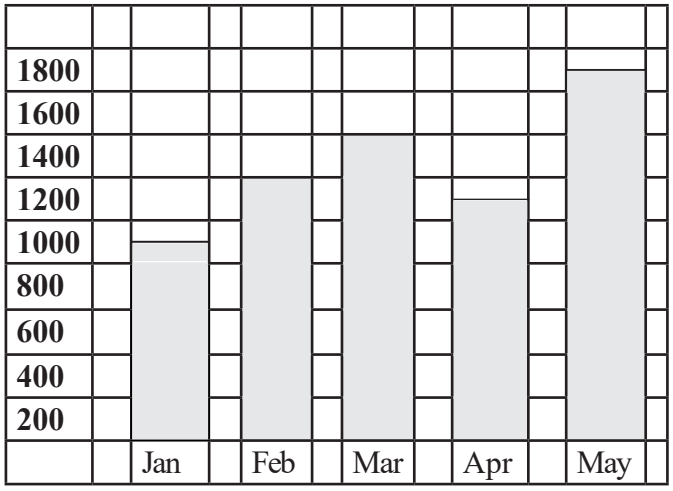
Review Exercise

1. (a) 0

(b) 4

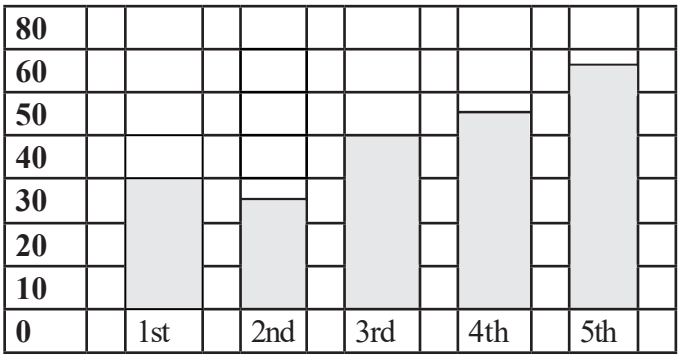
(c) 5

2.

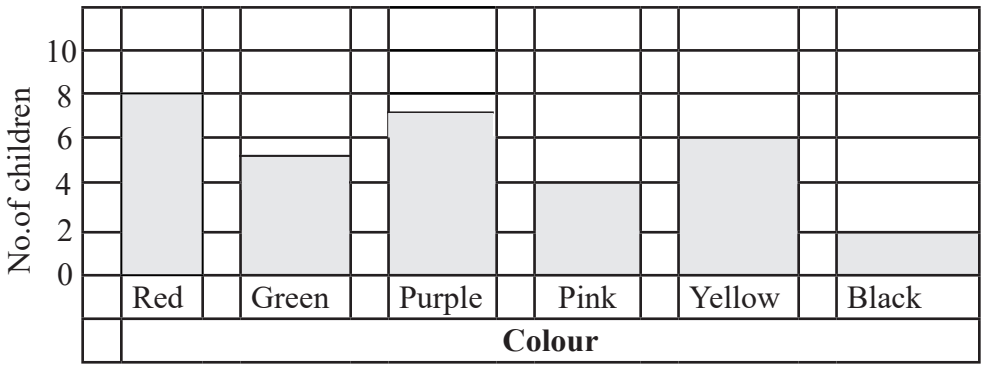


Scale 1 cm = 200 T.V. sets

6.



3.

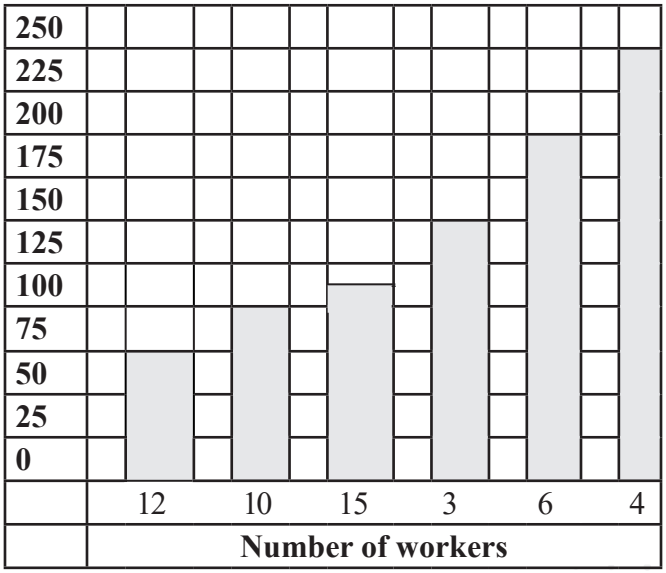


4. (a) Weight of boys

(b) Rakesh

(c) Sonu

5.



7.

Day	Number of students present	
Monday	 × 8	48 ÷ 6 = 8
Tuesday	 × 7	42 ÷ 6 = 7
Wednesday	 × 8 +  × 1	(48 ÷ 6) + 1 = 8 + 1
Thursday	 × 6 +  × 2	36 ÷ 6 + 2 = 6 + 2
Friday	 × 7 +  × 3	42 ÷ 6 + 3 = 7 + 3
Saturday	 × 6 +  × 3	36 ÷ 6 + 3 = 6 + 3
Scale	 = 6 Students,  = 1 Student	

Multiple Choice Question

1. (b) Data

2. (c) Pictograph

3. (i) (a) VI

(ii) (d) X

(iii) Total number of students = (Number of students in class VI + Class VII + Class VIII + Class IX + Class X)

= (6 × 10 + 6 × 9 + 6 × 9 + 6 × 7 + 6 × 5)

= 60 + 54 + 54 + 42 + 30 = 240

(c) 240

4. (i) (b) Math

(ii) (c) 95%

(iii) (c) 65%

(iv) (d) Total marks obtained

= 95 + 55 + 70 + 80 + 65 = 365

Answer: (d) 365

5. (d) D

6. (b) 650

7. (b) data

8. 150 × 5 = 750

Answer: (c) 750

9. (c) May

Check Your Progress

1. raw

2. numerical figures

3. Frequency

4. Different

5. Vertically

6. Pictograph

7. Uniform

8. Element

9. Equal

10. 1

Challenge

Football	5
Hockey	9
Cricket	9
Tennis	4
Kho-Kho	9
	36

Favourite game of students	
Sports	Number of students
Football	 × 5
Hockey	 × 1
Cricket	 × 1
Tennis	 × 4
Kho-Kho	 × 1

Scale, 1  = 9 students,  = 1 student

10 Mensturation

Exercise 10.1

1. (a) Perimeter = Sum of measurements of all sides

Perimeter = (40 + 40 + 40 + 40)m

= 160m

(b) Perimeter = Sum of measurements of all sides

Perimeter = (150 + 100 + 150 + 100)m

= 500m

(c) Perimeter = Sum of measurements of all sides

Perimeter = (12 + 12 + 12)m

= 36m

(d) Perimeter = Sum of measurements of all sides

Perimeter (90 + 60 + 50 + 30)m

= 230m

(e) Perimeter = Sum of measurements of all sides

(9 + 9 + 9 + 9 + 9)m

= 45m

(f) Perimeter = Sum of measurements of all sides

= (40 + 10 + 30 + 10 + 50 + 20)m = 160m

(g) Perimeter = Sum of measurements of all sides

= (40 + 50 + 30)m = 120m

(h) Perimeter = Sum of measurements of all sides

= (35 + 15 + 25 + 30 + 25)m

= 130m

(i) Perimeter = Sum of measurements of all sides

= (40 + 45 + 80 + 55)m

= 220m

2. (i) (a) Perimeter of rectangle = 2 (Length + Breadth)

Length = 50m, Breadth = 25m

Perimeter = 2(50 + 25)m

Perimeter = 2(75)m

Perimeter = 150m

(b) Perimeter of rectangle = 2 (Length + Breadth)

Length = 240m, Breadth = 120m

Perimeter = 2(240 + 120)m

Perimeter = 2(360)m

Perimeter = 720m

(c) Perimeter of rectangle = 2 (Length + Breadth)

Length = 22m, Breadth = 10m

Perimeter = 2 (22 + 10)m

Perimeter = 2(32)m

Perimeter = 64m

(d) Perimeter of rectangle = 2 (Length + Breadth)

Length = 40m, Breadth = 10m

Perimeter = 2(40 + 10)m

Perimeter = 2(50)m

Perimeter = 100m

(e) Perimeter of rectangle = 2 (Length + Breadth)

Length = 30m, Breadth = 15m

Perimeter = 2 (30 + 15)m

Perimeter = 2(45)m

Perimeter = 90m

(ii) (a) Perimeter of square = 4 × Side

(4 × 4)m = 16m

(b) Perimeter of square = 4 × Side

(4 × 30)m = 120m

(c) Perimeter of square = 4 × Side

(4 × 80)m = 320m

3. Side of square field = 60m

Length of fence going around it = Perimeter of square field

= (4 × side) = (4 × 60)m = 240m

Answer: Length of fence is 240m.

4. Length of side = 100m

Length of metal wire needed for 1 layer = Perimeter of square piece

= 4 × side = (4 × 100)m

= 400m

Length of metal required for 3 layer: 3 × Metal wire required for 1 layer

= 3 × 400m

= 1200m

Answer: 1200m length of metal wire is required

5. Length of picture: 30cm

Breadth of picture: 20cm

Different Length and Breadth are given as dimension of picure that concludes the pic is a rectangle

Length of wooden frame: Perimeter of rectangle

2(L + B) = 2(30 + 20)cm = 2(50)cm = 100cm

Answer: Wooden frame with length 100cm is required to frame the picture.

6. Length of rectangular field: 100m

Perimeter of rectangular field: 300m

Perimeter of rectangular field = 2 (Length + Breadth)

300m = 2(100m + Breadth)

$\frac{300}{2}$m = 100m + Breadth = 150m = 100m + Breadth

= Breadth = (150 – 100)m, Breadth = 50m

Answer: Breadth of rectangular field is 50m.

7. Perimeter of square garden: 84m

Perimter of square garden: 4 × Length of side

84m = 4 × Length of side

84m = 4 × Length of side

Length of side = $\frac{84}{4}$m

Length of side = 21m

Answer: Length of one of the side of square garden is 21m.

8. Length of side of square garden = 250m

Perimeter of square garden = (4 × 250)m

= 1000m

Cost of fencing square garden for 1 meter = ₹3.50

Cost of fencing square garden garden for 1000m = ₹(1000 × 3.50)

= ₹3500

Answer: Cost of fencing of a square garden of side 250m at the rate of ₹3.50 per meter is ₹3500.

9. Length of side of square: 63m

Perimeter of square = 4 × Side

= (4 × 63)m = 252m

Answer: Perimeter of square is 252m.

10. Cost for constructing boundary wall for per meter: ₹25

Total Cost for Constructing boundary wall: ₹1600

Perimeter of field: Total Cost for constructing boundary wall ÷ Total Cost for constructing boundary wall for per meter

= $\frac{1600}{25}$m = 64m

Length of each side of the wall $\frac{64}{4}$m

= 16m [side = $\frac{P}{4}$]

Answer: Length of each side of wall is 16m.

Puzzle

Area of garden = Area of Square = (Side × Side)

= (40 + 40) × (40 + 40)

= 80 × 80sq.ft

= 6400sq.ft

Area of garden each son will get = Area of garden ÷ Number of sons

= 6400 ÷ 4

= 1600sq.ft

Hens each son will get 1600sq.ft of garden.

Exercise 10.2

1. (a) Area of rectangle = Length × Breadth

Area of rectangle = 20m × 840cm (1m = 100cm)

= 20m = (20 × 100)cm

= 2000cm

= (2000 × 840)cm = 1680000cm^2 or 168m^2

(b) Area of rectangle = 840cm × (5dm 6m)

1dm = 10cm

1m = 100cm

Area if rectangle = (840cm × 5 × 10cm + 6 × 100cm)

= 546000cm^2

(c) Area of rectangle = (4m 5dm) × (6m × 8cm)

= (4 × 100cm + 5 × 10cm) × (6 × 100cm + 8cm)

= 400cm + 50cm × (600cm + 8cm)

= 450cm × 608cm

= 273600cm^2

2. (a) Area of square = side × side

Area of square = (8 × 8)m^2

= 64m^2

(b) Area of square = side × side

Area of square = (25 × 25)m^2

= 625m^2

3. Area of rectangular frame = Length × Width/ Breadth

1125sqcm = Length × 25cm

Length = $\left(\frac{1125}{25}\right)$cm

Length = 45cm

Answer: The Length of rectangular frame is 45cm.

4. (a) Area of square = Side × Side

225m^2 = Side × Side

(15 × 15)m^2 = 225m^2

Side = 15m

(b) Area of square = Side × Side

81mm^2 = Side × Side

81mm^2 = (9 × 9)mm^2

Side = 9mm

5. Breadth of rectangle: 75cm

Area of rectangle: 6750sqcm

Area of rectangle: Length × Breadth

6750sqcm = Length × 75cm

Length = $\left(\frac{6750}{75}\right)$cm

= 90cm

Answer: Length of rectangle is 90cm.

6. $\frac{120}{y} + y = 23$

$120 + y^2 = 23y$

$y^2 - 23y + 120 = 0$

7. Area of floor: (4 × 3)m^2 = 12m^2

Area of marble tile = 25cm × 20cm (1cm = $\frac{1}{100}$m)

= (0.25 × 0.20)m^2 (25cm = $\frac{25}{100}$m = 0.25m)

= 0.05m^2 (20cm = $\frac{20}{100}$m = 0.02m)

Number of tiles required to cover the floor:

$\frac{\text{Area of floor}}{\text{Area of marble tile}} = \frac{12}{0.05}$

= 240 Tiles

8. Let the length be x and breadth be y

Side of one tile of a square plot = 250 m

So the area = side × side = (250 × 250)m² = 62500 m²

Cost of levelling = Rs 2 per square meter

So the cost of levelling 62500 m² = 62500 × 2 = Rs 125000

Hence, the cost of levelling is Rs 125000.

9. Let the length of the field be x metres and breadth be y metres

Then,

xy = 2200 m

50y = 2200

$y = \frac{2200}{50} = 44m$

therefore,

The breadth of the field is 44m and length is 50m.

The perimeter = 2(x + y)

= 2(44 + 50)

= 2 × 94 = 188

Therefore, the perimeter of the field is 188m.

10. Given that length of a room = 6.6 m

Breadth of a room = 5.6 m

Area of a room = Length × Breadth = 6.6m × 5.6m = 36.96 m2

Width of a carpet = 70 cm = 0.7 m [Since 1m = 100 cm]

Length of a carpet = Area of a room

36.96 = Length of the carpet × 0.7

$\text{Length of the carpet} = \frac{36.96}{0.7}$

Length of the carpet = 52.8 m

Cost of the carpet per square = $\frac{\text{Total cost of the carpet}}{\text{Total cost of the carpet}} = \frac{3960}{53.8} = ₹75$

11. Given length of playground = 75 m 20 cm = 75.20m

Breadth of playground = 34m 80cm = 34.80 m

Area of rectangle = l × b

= 75.2m × 34.8m

= 2916.96m²

Cost of levelling per m² = ₹1.5

Cost of levelling 2916.96 m² = ₹1.5× 2916.96= ₹3925

Perimeter of playground = 2(l + b) = 2(75.20 + 34.80) = 220 m

Since the boy took 3 rounds, distance covered = 3 × 220 = 660 m

Speed of walking = 1.5 m per sec

Recall that speed = $\frac{\text{distance}}{\text{time}}$

Therefore, time = $\frac{660}{1.5}$ = 440 seconds or 7.33 minutes

12. Area of 1 brick = 20 × 15 = 300 cm

Bricks in ₹750 = 1000

Bricks in ₹49,500: $\frac{\text{Total cost of used bricks}}{\text{cost of 1000 bricks}}\times$

1000 bricks = $\frac{49500}{75} \times 1000 = 66000$

The total number of bricks used is 66000.

Area occupied by the total number of bricks represents the area of the lane.

Therefore,

Area of lane=total number of bricks×area of each brick

= l × 5m = 66000 × (20cm × 15cm)

$= l = 66000 \times \frac{20cm \times 15cm}{5m}$

$= l = 66000 \times \frac{20cm \times 15cm}{500cm}$

= l = 39600cm = l = 396m [1m = 100cm]

13. Case (1st)

If the length of side is doubled

Side of square =2a

And

Area = $(2a)^2 = 4a^2$

that means ...

Area become four times of Area when length of side is doubled.

Case (2nd)

If length of side is halved

Side = $\frac{a}{2}$

Area of square = $(\frac{a}{2})^2 = \frac{a^2}{2}$

that means.

Area become one-fourth when side of square is halved.

14. Area of rectangular filed = Length × Breadth
= (180 × 650)m^2
= 117000m^2

15. Length = 180m
Breadth = 650m
As, length and breadth are given, we are sure that the field is rectangular in shape.
Area of Rectangle = (Length × Breadth)
Area of field = (180 × 650)m^2
=1,17,000m^2

Review Exercise

1. (a) Perimeter = Sum of length of all the sides
= 2cm + 4cm + 5cm + 2cm + 5cm + 4cm + 2cm + (4cm + 2cm + 4cm)
= 34cm

(b) Perimeter = (2 + 4 + 4 + 2 + 8 + 8 + 8 + (8–(2 + 2)))cm
= (36 + (8 – 4))cm
= (36 + 4)cm = 40cm

2. (a) Perimeter of rectangular figure (Length & Breadth are different and oppsite sides are equal)
= 2 (Length + Breath)
= 2(40 + 25)cm = 2(65)cm = 130cm
Area = Length × Breath
= (40 × 25)cm^2
= 1000cm^2

(b) Perimeter of squarical figure (All 4 sides are equal)
= 4 × Side
= (4 × 30)cm = 120cm

(c) Area of squarial figure
= side × side
= (30 × 30)m^2 = 900m^2

(d) Perimeter of squarical figure (all 4 sides are equal)
= 4 × Side
= (4 × 20)cm = 80cm
Area = Side × Side
= (20 × 20)cm^2
= 400cm^2

3. (a) Area of square = Side × Side
625sqcm = (25 × 25)cm^2
side = 25cm

(b) Area of square = Side × Side
900sqcm = (30 × 30)cm^2
Side = 30cm

4. Area of rectangular filed: Length × Breadth
= (120 × 50)cm^2
= 6000cm^2
Area of square filed: Side × Side
= (75 × 75)cm^2
= 5700cm^2
Area of rectangular field > Area of square field
6000cm^2 > 5700cm^2
Answer: One will choose rectangular field of size (120 × 50)cm^2 as it has more are than square field of (75 × 75)cm^2

5. (a) Breadth = 80m, Area = 7200sqm
Area = Length × Breadth
7200sqm = Length × 80m
Length = $\left(\frac{7200}{80}\right)$m
Length = 90m

(b) Area = 1728sqcm; Side = 48cm
Area = Length × Breadth
1728sqcm = Length × 48cm
Length = $\left(\frac{1728}{4}\right)$cm
Length = 36cm

6. Length = 20m + Breadth

Perimeter of rectangular field = 2(Length + Breadth)

280m = 2(20m + Breadth + Breadth)

280m = 2(20m + 2Breadth)

280m = 40m + 4 Breadth

(280 – 40)m = 4 Breadth

240m = 4 Breadth

Breadth = $\left(\frac{240}{4}\right)$m

Breadth = 60m

Length = 20 + Breadth

Length = (20 + 60)m

Length = 80

Answer: Breadth and Length of rectangular field are 60m and 80m respectively.

7. Length of Anand's garden: 70m

Breadth of Anand's garden: 50m

Perimeter of Anand's rectangular garden: 2(Length + Breadth)

= 2(70 + 50)m

= 2(120)m

= 240m

Length of wire required for fencing the garden 1 time = Perimeter of Anand's garden

Length of wire required for fencing the garden 3 times – 3 × Perimeter of Anand's garden

= 3 × 240 = 720m

Answer: 720m Length of wire is required for fencing the garden 3 times.

8. Perimeter of square = 4 × Side

40cm = 4 × Side

Side = $\left(\frac{40}{4}\right)$cm, = 10cm

∴ Length of side is 10cm

9. Length of rectangular field: 80m

Breadth of rectangular field: 60m

Perimeter of rectangular field: 2 (Length + Breadth) = 2(80 + 60)m

= 2(140)m = 280m

Length of wire required for fencing rectangular field 1 time = Perimeter of rectangular field.

Length of wire required for fencing rectangular field 3 timed = 3 × Perimeter of rectangular field

= 3 × 280m = 840m

Answer: 840m of wire is required for fencing rectangular field 3 times.

10. Length of marble tile: 10cm

Breadth of marble tile: 12cm

Area of marble tile = Area of rectangle (opposite side are equal)

10cm = $\frac{10}{100}$m (1cm = $\frac{1}{100}$m)

10cm = 0.1m

Area = Length × Breadth

(12 × 0.1)m^2

= 1.2m^2

Length of floor = 3m

Breadth of floor = 4m

Area of floor = Area of rectangle

Area (3 × 4)m^2

Area = 12m^2

Number of tiles required to cover the floor = $\frac{\text{Area of floor}}{\text{Area of tile}} = \frac{12m^2}{1.2m}$

= 10

Answer: 10 tiles are required to cover the floor.

11. Area of square picture = 441sqcm

Area = Side × Side

441sqcm = (21 × 21)cm^2

Side = 21cm

12. Given: Rectangular plot

Length = 240m, Breadth = 200m

Area = 2(Length + Breadth)

= 2(240 + 200)m^2 = 2(440)m^2

= 880m^2

Cost of fencing per meter = ₹30

Cost of fencing $880m^2$ = ₹(880 × 30)

= ₹26400

Answer: Cost of fencing the entire field is ₹26400.

13. Let AB = 300m be the length of the rectangular filed ABCD.

Therefore,

Breadth BC of the field = $\frac{2}{3}$ × 300 = 200m

Since, the with of the road is 10m, therefore,

= PQ = AB + 2 × 10 = 300 + 20 = 320m and

= QR = BC + 2 × 10 = 200 + 20 = 220m

Now, area of the road so constructed = Area of rectangle PQRS – Area of rectangle ABCD

= 320 × 220 – 300 × 200

= 70400 – 60000

= $10400m^2$

14. Side of square filed: 120 metre

Area of square filed: Side × Side

= $(120 \times 120)m^2$

= $14400m^2$

Cost of preparing gross lawn peimeter = ₹30

Cost of preparing gross lawn for 14400 metre = ₹(14400 × 30)

= ₹432000

Answer: Cost of converting the entire filed into lawn is ₹4,32,000.

Multiple Choice Questions

1. Perimeter of triangle = Sum of its sides

= x + y + z (d) x + y + z

2. Perimeter of rectangle = 2 × (Length + Breadth)

(b) 2 × (Length + Breadth)

3. Number sides of a regular pentagon = 5

(All sides are equal)

So, Perimeter of pentagon = Side + Side + Side + Side + Side

= 5 × Side (c) 5 × Side

4. (a) Length × Breadth

5. Perimeter of square = 4 × Side

16cm = 4 × Side

Side = $\left(\frac{16}{4}\right)$cm

= 4cm

Area of square = Side × Side

= $(4 \times 4)cm^2$

= $16cm^2$

(a) 16sqm

6. Area of square = Side × Side

100sqm = (10 × 10)m

Side = 10m

Perimeter = (4 × 10m)

= 40m

(c) 40m

7. (a) All sides are equal

8. Side of square floor = 9m

Area of square floor = Side × Side

= $(9 \times 9)m^2$

= $81m^2$

Area of carpet needed to cover the floor = Area of the square floor

= 81sqm (b) 81sqm

9. Area of rectangle = Length × Breadth

Area of rectangle = Breadth

Length (c) Area ÷ Length

10. 1m = 100cm

$(1m)^2 = (100cm)^2$

1m × 1m = 100cm × 100cm

$(1m)^2$ = 1000sqcm

1sqm = (c) 10000sqm

11. Given: Rectangle

Perimeter: 160cm

Perimeter = 2(Length + Breadth)

160cm = 2(25 + Breadth)

$\frac{160}{2}$cm = 25 + Breadth

25cm + Breadth = 80cm, Breadth = (80 – 25) cm = 55cm

(c) 55cm

12. Area of rectangle = $108cm^2$

Length × Breadth = $108cm^2$

12cm × Breadth = $108cm^2$

Breadth = $\left(\frac{108}{12}\right)$cm

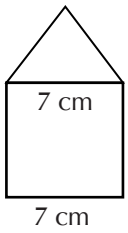
Breadth = 9cm

Ratio of breadth to its length is: $\frac{\text{Breath}}{\text{Length}} = \frac{9cm}{12cm}$

$= \frac{3cm}{4cm} = 3 : 4$

(c) 3 : 4

13.



All Sides of square are equal, hence, the base of equilateral triangle will also be of 7cm.

All side of equilateral traingle equal, hence all sides will will be of 7cm.

Perimeter Sum of all side

Perimeter of Figure = (7 + 7 + 7 + 7 + 7 + 7)cm = 42cm

(d) 42cm

14. Perimeter of square = 4 × side

28cm = 4 × side

Side = $\frac{28}{4}$cm, Side = 7cm

Area of square = Side × Side

= $(7 \times 7)cm^2 = 49cm^2$ (b) $49cm^2$

15. Area of board = $(8 \times 6)m^2 = 48m^2$

Number of equal square it is cut: 12

Area of each square: $\frac{\text{Area of board}}{\text{Number of squares}} = \left(\frac{98}{12}\right)m^2$

= $4m^2$

Area of square = Side × Side

$4cm^2 = (2 \times 2)m^2$

Side = 2m

Perimeter of square = 4 × Side

= 4 × 2m = 8m

(d) 8m

Check your Progress

1. (a) Area of rectangle = Length × Breadth

= $(11 \times 9)cm^2 = 99cm^2$

2. Area of rectangle = Length × Breadth

144sqcm = 16cm × Breadth

Breadth = $\frac{144}{16}$cm

Breadth = 9cm

3. Number of sides in a regular hexagon: 6

All sides of regular hexagon are equal

Perimeter of hexagon = Sum of all six sides

If one side = x then, Perimeter of hexagon: x + x + x + x + x + x

= 6x

4. Perimeter of regular pentagon = Side + Side + Side + Side + Side

Number of sides in a regular pentagon = 5

All sides of regular pentagon are equal

5 sides = 65cm

Side = $\frac{65}{5}$cm

Side = 13cm

Answer: Length of each of requlr pentagon is 13cm.

5. Perimeter of Triangle = Sum of all three sides

Let the third side be x

42 = 16 + 12 + x

x = 42 – 28

x = 14cm

6. According to question

Perimeter of square = Area of square

4 × Side = Side × Side

4 × Side

Side = 4cm

7. Length of piece of string = 45cm

It is bent into an equilteral traingle

In a equilateral triangle all 3 sides are equal.

So,

Side + Side + Side = 45cm

3 Side = 45cm

Side = $\frac{45}{3}$, Side = 15cm

8. No two distinct squares cannot have equal perimeter as in square with side, the value of perimeter changes.

9. Yes, we can have 2 distinct rectangles with same perimeter

Like, Let perimeter be 12cm

Rectangle I

Length = 4cm

Breadth = 2cm

Perimeter = 2(Length + Breadth)

= 2(4 + 2)cm

2(6)cm = 12cm

Rectangle II

Length = 5cm

Breadth = 1cm

Perimeter = 2(Length + Breadth)

= 2(5 + 1)cm

2(6)cm = 112cm

10. When side of a square doubles the perimeter of the square also doubles.

Challenge

Give, are of each square on a chess board = $4cm^2$

we Know that, there are 64 square on a chess board

$\therefore$ Area of the chess board = Total number of squares × Area of 1 square

= 64 × 4 cm2 = $256cm^2$

We, know that there are 32 chess men at the beginning of game [Each occupying square]

$\therefore$ Number of squares unoccupied at the beginning of game = 64 – 30 = 32

Number of chessman captured = 9

Total area unoccupied = 32 + 9 = 41 squares

Area of unoccupied squares = 41 × $4cm^2$

= $164cm^2$

11 Algebra

Exercise 11.1

1. (a) $x + 3$ (b) $x - 2$

(c) $x - 7$ (d) $x \times 4 = 4x$

(e) $x + 7$ (f) $1 + x$

(g) $x \times 7 = 7x$ (h) $1 - (2 \times x) = 1 - 2x$

(i) $x - 9$

2. (a) $4 \times x + 3 = 4x + 3$

(b) $x + 12$

(c) $3 \times x - y = 3x - y$

(d) $\frac{7 \times x}{y} = \frac{7x}{y}$

(e) $(5 \times x) \times (2 \times y) = 5x \times 2y = 10xy$

Exercise 11.2

1. (a) Cost of one article = a

Cost of m article = a × m = b

b = am

(b) Selling price = Cost price + Profit

S = C + P

(c) Perimeter = 4 × side

Perimeter = 4 × s

Perimeter = 4s

(d) Perimeter = 5 times the length

Perimeter = 5 times × x

Perimeter = 5 × x

Perimeter = 5x

2. (a) n = 1

$2n + 4 = 6$, $2(1) + 4 = 6$, $2 + 4 = 6$, $6 = 6$ Yes

(b) = 1

$5x - 3 = 5$, $5(1) - 3 = 5$, $5 - 3 = 5$, $2 \neq 5$ No

(c) $x = 1$, $2x - 7 = 6$

$2(1) - 7 = 6$, $2 - 7 = 6$, $5 \neq 2$ No

(d) $x = 1$, $7x - 2 = 5 = 7(1) - 2 = 5$, $7 - 2 = 5$, $5 = 5$ Yes

(e) $x = 2$, $9 - 3x = 3$, $9 - 3(2) = 3$, $9 - 6 = 3$, $3 = 3$ Yes

(f) $x = 10$, $9 + 2x = -11$, $9 + 2(10) = -11$, $9 + 20 = -11$, $29 \neq -11$ No

(g) $2x - 9 = 7$, $x = 5$

$2(5) - 9 = 7$, $10 - 9 = 7$, $1 \neq 7$

(h) $a = 3$, $a + 6 = 9$, $3 + 6 = 9$, $9 = 9$ Yes

(i) $4a = 32$, $a = 8$, $4 \times 8 = 32$, $32 = 32$ Yes

(j) $a = 2$, $4a + 3 = 7$, $4 \times 2 + 3 = 7$, $8 + 3 = 7$, $11 \neq 7$ No

3. (a) 3; a, bc, bd

(b) 3; a, b, c

(c) 3; ab, bc, ca

(d) $2a^2b$, ab^2

(e) 3; $3x^2y^3$, x^3y^2, 3xy

4. (a) 7x:7

(b) $2x^3y$: 2

(c) $-3xy^3$: -3

(d) $-xyz$: -1

(e) p^3qr: 1

(f) 2:2

(g) 0:0

Exercise 11.3

1. (a) 4x, y (b) 9ab, –5

(c) 5a, –4b, c

2. (a) 4y – 4xy – 3x

(b) x – 4y

(c) 2bc – 7ab – 9a

3. (a) 3x – 5y + 3z: Three terms = Trinomial

(b) 3xyz: 1term = Monomial

(c) $2x^2 + y$: 2terms = Binomial

(d) $a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$: Serveral terms = Polynomial

4. (a) $6y = 6$

(b) $7ax = 7$

(c) $8xy = 8$

(d) $7xyz = 7$

(e) $y = 1$ $xy = 1$

(f) $10y = 10$

(g) $mn = 1 \times mn = 1$

(h) $2abc = 2$

5. (a) $ab = 1 \times ab = ab$

(b) $-6bc = bc$

(c) $7xyz = xyz$

(d) $-2x^3y^3z = x^3y^3z$

Puzzle

ones digit = x

Tenis digit = Twice of ones digit × 10

= 2x × 10 = 20x

Exerice 11.4

1. (a) x = 3

$4x - 2 = 10$

$4 \times 3 - 2 = 10, 12, -2 = 10, 10 = 10$

LHS = RHS

Hence, 3 is a root of $4x - 2 = 10$

(b) x = 7

$4x - 2 = 26$

$4 \times 7 - 2 = 26$

$28 - 2 = 26$

$26 = 26$

LHS = RHS

Hence, 7 is a root of $4x - 2 = 26$

2. (a) Let the cost of pencil be x

According to question cost of rubber is ₹8

Cost of pencil + ₹3 more than rubber

Hence, x = 8 + 3, Algebric equation n = x – 3 = 8

(b) Let the number of hour spent doing his homework be x.

Total number of hours Sanjay studies: 7 hours

Number of hours Sanjay studies in school: 5 hours

Number of hours Sanjay studies in school = Total hours – Time spent Studying in school

Hence, x = 7 – 5

Algebric equation: x + 5 = 7

(c) Seven less than a number y = y - 7

Hence, y–7 = 9

(d) One more a number p = 1 + p

Hence, 1 + p = 17

(e) Sum of a number y and 10 = y + 10, Hence y + 10 = 30\

(f) 15 less than a number x = x – 15

Hence, y + 10 = 30

(g) A number k plus 2 = k + 2, Hence, k + 2 = 20

(h) A number b plus 20 = b + 20, Hence, b + 20 = 32

(i) Let the number be x

4 more than the number = 4 + x, hence, 4 + x = 10

(j) Let the number be x

9 less than the number = x – 9, Hence x – 9 = 10

(k) Let the number be Sum of 4 and the number = 4 + x, Hence 4 + x = 17

(l) 3 less than the number p = p – 3, Hence, p – 3 = 9

3. (a)

Keep a number in your mind = Let the number be x

Multiply it by 7	=	$x \times 7 = 7x$
Add 2	=	$7x + 2$
Divide by 3	=	$\frac{7x + 2}{3}$
Subtract 2	=	$\frac{7x + 2}{3} - 2$

Subtract the original number = $\left(\frac{7x + 2}{3} - 2 - x\right)$

(b) Keep a number in your mind = Let the number be x

Add 9 = $x + 9$

Multiply by 2 = $(x + 9) \times 2 = 2x + 18$

subtract 3 = $2x + 18 - 3 = 2x - 15$

Divide by 5 = $\frac{2x - 15}{5}$

Subtract the original number = $\frac{2x - 15}{5} - x$

4. (a) Let the number of Orange be x.

Cost of 1 Orange = ₹4

Worth of all the Oranges bought by Poonam: ₹60

Number of Oranges bought by Suman × Cost of 1 Orange = Total worth of Oranges

$= 4x \times 4 = 60$

Hence, $4x = 60$

(b) Let the number of pencil in the box before addition be x.

Number of pencils added = 14

Total pencil after addition = 90

Number of pencil before addition = Total number of pencil – Numer of pencil added

$x = 90 - 14$

Hence $X + 14 = 90$

(c) Let the number of rubbers in one packet be x

Total number of rubber in 4 packet = $4 \times x = 4x$

Number of rubber removed = 30

Number of rubbers left = 30

Total number of rubbers = Number of rubbers removed + Number of rubbers left

$= 4x = 30 + 30$

Hence, $4x - 30 = 30$

Puzzle

Let the number be x

Half of number + 1 = $0.5x + 1$

Triple of number + 4 = $3(0.5x + 1) + 4$

$= 1.5x + 3 + 4$

$= 1.5x + 7$

According to question

$= 1.5x + 7 = x + 23$

$0.5x = 16$

$x = \frac{16}{0.5}$, $x = 32$

Hence the number is 32.

Exercise 11.5

1. (a) 1□ + 1□ = 4□

1□ = 3□ (Removing 1□ from both the sides)

Hence, 3□ will balance the other side

(b) 2□ + 1□ = 5□

2□ = 4□ (Removing 1□ from both the side)

$\frac{2\square}{2} = \frac{4\square}{2}$ (Dividing both the sides by 2)

1□ = 2□

Hence, 2□ will balance the other side

(c) 1□ + 5□ = 2□

5□ = 2□ – 1□

5□ = 1□

Hence , 5□ will balance the other side

(d) 2x + 3● = 3x + ●

3● – ● = 3x – 2x

X = 2●

2x = 4● (Dividing both the sides by 2)

Hence, 2● will balance the other side.

(e) $2x + 1 = 2x + 1$

By hidden method let, $x = 0$

$2(0) + 1 = 2(0) + 1$

$1 = 1$

Hence, the other side will be balanced by 0.

(f) $9x + 3 = 4x + 23$

$9x - 4x = 23 - 3$

$5x = 20$

$x = \frac{20}{5}$

$x = 4$

Hence, the other side will be balanced by 4.

(g) $2x-3 = x + 9$

$2x - x = 9 + 3$

$x = 12$, Hence the other side will be balanced by 12.

(h) $5x - 20 = 2x + 10$

$5x - 2x = 10 + 20$

$3x + =0\ 30$

$x = 30/3$, $x = 10$

Hence, the other side will be balanced by 10.

2. (a) $2x = 60$

$\frac{2x}{2} = \frac{60}{2}$, $x = 30$

(Dividing by 2)

(b) $36 = 9x$

$\frac{9x}{9} = \frac{36}{9}$, $x = 4$

(Dividing by 9)

(c) $16k = 640$

$\frac{16k}{16} = \frac{640}{16}$

$k = 40$

(Dividing by 16)

(d) $4a = 08$

$\frac{4a}{4} = \frac{0.8}{4}$

$a = 0.2$

(Dividing by 4)

(e) $1.2y = 14.4$

$\frac{1.2}{1.2}y = \frac{14.4}{1.2}$

$y = 12$

(Dividing by 1.2)

(f) $+0.3x = +0.6$

$\frac{0.3x}{0.3} = \frac{0.6}{0.3}$ (Dividing by 0.3)

$x = 2$

(g) $4t = 400$

$\frac{4t}{4} = \frac{400}{4}$ (Dividing by 4)

$t = 100$

(h) $+0.07 = +0.01x$

$\frac{0.07}{0.01} = \frac{0.01}{0.01}$ (Dividing by 0.01)

$x = 7$

(i) $\frac{x}{8} = 9$

$\frac{x}{8} \times 8 = 9 \times 8$ (Multiplying by 8)

$x = 72$

(j) $\frac{x}{4} = \frac{1}{16}$

$\frac{x}{4} \times 4 = \frac{1}{16} \times 4$ [Multiplying by 4]

$x = \frac{1}{4}$

(k) $\frac{z}{7} = \frac{1}{49}$

$\frac{z}{7} \times 7 = \frac{1}{49} \times 7$ (Multiplying by 7)

$z = \frac{1}{7}$

3. (a) $3x + 2 = 10 - \boxed{2}$

$3x + 2 - 2 = 10$ (Subtracting both sides by 2)

$3x = 8$

$\frac{3x}{3} = \frac{8}{3}$ (Dividing both sides by 3)

$x = \frac{8}{3}$

(b) $\frac{y + 7}{4} = 14$

$\frac{y + 7}{4} \times 4 = 14 \times 4$ (Multiplying both sides by 4)

$y + 7 = 14 \times \boxed{4}$

$y + 7 = 56$

$y = \boxed{56} - \boxed{7} = \boxed{49}$

4. (a) $\frac{7t}{8} = 7$ (Multiplying both side by 8)

$\frac{7t}{8} \times 8 = 7 \times 8$

$7t = 56$

$\frac{7t}{7} = \frac{56}{7}$ [Dividing both sides by 7]

$t = 8$

(b) $\frac{9m}{11} = 27$ (Multiplying both sides by 11)

$\frac{9m}{11} \times 11 = 27 \times 11$

$9m = 297$ (Dividing both sides by 9)

$\frac{9m}{9} = \frac{297}{9}$

$m = 33$

(c) $\frac{2t}{3} = 6.2$ (Multiplying both side by 3)

$\frac{2t}{3} \times 3 = 6.2 \times 3$

$2t = 18.6$ (Dividing both side by 2)

$\frac{2t}{t} = \frac{18.6}{2}$

$t = 9.3$

(d) $\frac{5x}{7} = \frac{28}{28}$

$\frac{5x}{7} \times 7 = \frac{28}{28} \times 7$ (Multiplying both side by 7)

$5x = \frac{196}{28}$

$\frac{5x}{5} = \frac{196}{28 \times 5}$ (Dividing both sides by 5)

$x = \frac{196}{140}$

$x = 1.4$

(e) $\frac{8x}{3} = \frac{16}{9}$

$\frac{8x}{3} \times 3 = \frac{16}{9} \times 3$ (Multiplying both side by 3)

$8x = \frac{16}{3}$

$\frac{8x}{8} = \frac{16}{3 \times 8}$ (Dividing both sides by 8)

$x = \frac{16}{24}$

$x = \frac{2}{3} = 0.66$

5. (a) $x - 2 = 5$

$x = 5 + 2$ (Adding 2 on both the sides)

$x = 7$

(b) $k - 40 = -60$

$k - 40 + 40 = -60 + 40$ (Adding 40 to both the sides)

$k = -20$

(c) $z - 20 = 62$

$z - 20 + 20 = 62 + 20$ (Adding 20 to boths the sides)

$z = 82$

6. (a) $4x + 7 = 10$

$4x + 7 = 7$

$= 10 - 7$

$4x = 3$

$\frac{4x}{4} = \frac{3}{4}$

$x = \frac{3}{4}$

(b) $x + 9 = 76$

$x + 9 - 9 = 76 - 9$ (Subtracting 9 from both the sides)

$x = 67$

(c) $y + 50 = 40$

$y + 50 - 50 = 40 - 50$ (Subtracting 50 from both the sides)

$y = -10$

(d) $4x + 5 = 17$

$4x + 5 - 5 = 17 - 5$ (Subtracting 5 from both the sides)

$4x = 12$

$\frac{4x}{4} = \frac{12}{4}$ (Dividing 4 from both the sides)

$x = 3$

(e) $2k + 7 = 19$

$2k + 7 - 7 = 19 - 7$ (Subtracting 7 from both sides)

$2k = 12$

$\frac{2k}{2} = \frac{12}{2}$ (Dividing 2 from both sides)

$k = 6$

(f) $8r - 23 = -7$

$8r - 23 + 23 = -7 + 23$

(Adding 23 to both the sides)

$8r = 16$ (Dividing both the sides by 8)

$\frac{8r}{8} = \frac{16}{8}$

$r = 2$

7. (a) Let the number x

3 times the number = $3x = 3x$

Decreased by 9 = $3x - 9$

$3x - 9 = 18$ (Adding 9 in both the side)

$3x - 9 + 9 = 18 + 9$, $3x = 27$ (Dividing by 3)

$\frac{3x}{3} = \frac{27}{3}$, $x = 9$

(b) Product of a number y and 8 = $y \times 8 = 8y$

$8y = 72$ (Dividing both the sides by 8)

$\frac{8y}{8} = \frac{72}{8}$, $y = 9$

(c) Number x divided by 10 = $\frac{x}{10}$

$\frac{x}{10} = 9$

$\frac{x}{10} \times 10 = 9 \times 10$ (Multiplying by 10 on both the sides)

$x = 90$

(d) Let the integer be x

Subtract 7 from integer = $x - 7$

$x - 7 = 20$

Adding 7 to both the sides

$x - 7 + 7 = 20 + 7$

$x = 27$

8. (a) $3(x + 6) = 21$

$= 3x + 18 = 121$

$\frac{3x + 18}{3} = \frac{21}{4}$ (Dividing both sides by 3)

$x + 6 = 7$

$x = 7 - 6$, $x = 1$

(b) $16(3x - 5) - 10(4x - 8) = 40$

$48x - 80 - 40x + 80 = 40$

$48 - 40x - 80 + 80 = 40$

$8x = 40$

$\frac{8x}{8} = \frac{40}{8}$

(Dividing by 8 on both the sides)

$x = 5$

(c) $3(2 - 5x) - 2(1 - 6x) = 1$

$6 - 15x - 2 + 12x = 1$

$-15 + 12x + 6 - 2 = 1$

$-3x + 4 = 1$

So, $-3x + 4 - 4 = 1 - 4$

(Subtracting 4 on both the sides)

$-3x = -3$

$\frac{-3x}{-3} = \frac{-3}{3} = X = 1$

(Dividing by -3 on both the sides)

(d) $8(2x - 5) - 6(3x - 7) = 1$

$16x - 40 - 15x + 42 = 1$

$16x - 18x - 40 + 42 = 1$

$= -2x + 2 = 1$

$= -2x = 1 - 2$

$-2x = -1$

$\frac{-2x}{-2} = \frac{-1}{-2}$ (Dividing by –2 on both the sides)

$x = 1/2$

(e) $3(x + 2) - 2(x - 1) = 7$

$3x + 6 - 2x + 2 = 7$

$3x - 2x + 6 + 2 = 7$

$x + 8 = 7$

$x = 7 - 8$

$x = -1$

(f) $x + 1 = 5$

$x + 1 - 1 = 5 - 1$

(Subtracting –1 on both the sides)

$x = 4$

(g) $4(x - 1) = 8$

$4x - 4 = 8$

$4x = 12$

(Dividing by 4 on both the sides)

$\frac{4x}{4} = \frac{12}{4} = x = 3$

(h) $5(x - 2) + 3(x + 1)$

$5x - 10 + 3x + 3 = 25$

$5x + 3x - 10 + 3 = 25$

$8x - 7 = 25$

$8x - 7 + 7 = 25 + 7$ (Adding 7 on both sides)

$8x = 32$

$\frac{8x}{8} = \frac{32}{8}$ (Dividing by 8 on both sides)

$x = 4$

(i) $3x - 2(2x - 5) = 2(x + 3) - 8$

$3x - 4x + 10 = 2x + 6 - 8$

$-x + 10 = 2x - 2$

$-x - 2\ x = -2 - 10$

$-3x = -12$

$\frac{-3x}{-3} = \frac{-12}{-3}$ (Dividing by –3 on both sides)

$x = 4$

(j) $x = 2x$

$x \times 5 = (2x - \frac{8}{5}) \times 5$ (Multiplying by 5 on both sides)

$5x - 10x = -8$

$-5x = -8$

$\frac{-5x}{-5} = \frac{-8}{-5}$

$x = \frac{8}{5}$

Exercise 11.6

1. Given: Poonam's age = 8 years + Preeti age

Poonam's age + Preeti's age = 24

Preeti's age	Poonam's age (Preeti age +8)	Sum of their ages = 24
0	8	8
1	9	10
2	10	12
3	11	14
4	12	16
5	13	18
6	14	20
7	15	22
8	16	24

Hence, Preeti is 8 years old

2. Given: Raju's age = Jai's + 5 years

2× Raju's age + 5× Jai's age = 80

Let Jai's age be 5 years old. Then Raju's age will be 10 years as he is 5 years older than Jai.

$2 \times (10) + 5(5)$

$= 2 \times 10 + 25 = 20 + 25 = 45$

This is less than 80, So the actual age of boys must be more than we assumed.

Let Jai's age be 10 years old. Then Raju's age will be 15 years

$= 5 \times 10 + 2 \times 15$

$= 50 + 30 = 80$

So, Jai is 10 years old and Raju is 15 year old.

3. Given sum of 2 number = 80

Difference of 2 numbers = 16

Let the numbers be 48 and 32

48 + 32 = 80

48 – 32 = 16

Hence, the numbers are 48 & 32.

4. Given: Total number of items = 20

Stools: 3 legs, Charis: 4 legs

Total number of legs = 72

Let the stools and chairs be x and y respectively

According to Question

x + y = 20 (Number of items)

3x + 4y = 72 (Number of legs)

x	y	3 × x	4 × y	3x + 4y	x + y
5	9	15	36	51	14
6	10	18	40	58	16
7	11	21	44	65	18
8	12	24	48	72	20

x = 8, y = 12

Hence, he can make 8 stools and 12 chairs.

5. Distance between Mr. Saxena's house and the main road: 900m

Distance between each pole: 50m

Number of poles fixed:

$\frac{\text{Total distance between Mr. Saxena's house mans Road}}{\text{Distance between pole}}$ –1

– [Last connection is of house]

$= \frac{900m}{50m} - 1 = 18 - 1 = 17$

Answer: Total 17 poles are fixed

6. Number of brothers Gupta family atleast have: 2

Number of sister Gupta family atleast have: 1

Least number of children in the family = Number of brother + Number of sister in Gupta family = 2 + 1 = 3

Answer: There are at least 3 children in Gupta family = 2 + 1 = 3

7. Time to cut pipe in 2 pieces = 6min

Time to cut pipe in 1 piece = $\frac{\text{Time to cut pipe in 2 pieces}}{2}$

$= \frac{6 \text{ min}}{2} = 3$ minutes

Time to cut pipe in 5 pieces

Time to cut pipe in 1 piece × 5

= 3 minutes ×5 = 15 minutes

Answer: It will take 15 minutes to cut a pipe in 5 pieces.

8. Length of Fence: 8m

Length between posts: 1m

Number of poles: $\frac{\text{Length of fence}}{\text{Length of posts}} = \frac{8}{1}$

= 8 posts – 1 posts = 7 posts

9. (a) Pairs with sum equal to 10

1	9
2	8
3	7
4	6

= 4 pairs

(b) Pair with sum equal to 8.

0	8
1	7
2	6
3	5

= 4 pairs

(c) Pairs with sum equal to 15

6	9
7	8

= 2 pairs

(d) Groups of three cards with sum equal to 20.

6	9	5
7	8	5

= 2 pairs

10. Let the number be x

Number divided by 4 = $\frac{x}{4}$

Inc. by 6 = $\frac{x}{4} + 6$

$\frac{x}{4} + 6 = 10$

$\frac{x}{4} = 10 - 6$

$\frac{x}{4} = 4$

$\frac{x}{4} \times 4 = 4 \times 4$ [Multiplying both sides by 4]

$x = 16$

Hence, the number is 16

11. Cost of 6 pens = 90

Cost of 1 pen = $\frac{\text{Cost of 6 pens}}{6} = ₹\frac{90}{6}$

= ₹15

Answer: Cost of 1 pen is ₹15.

12. Let the other number be x

$x + 32 = 92$

$x = 92 - 32$

$x = 60$

Answer: Other number is 60.

13. Let the first integer be x

They are consecutive int. then the other numbers will be (x + 1) and (x + 1 + 1)

= (x + 2)

Sum of the numbers = 45

$x + x + 1 + x + 2 = 45$

$3x + 3 = 45$

$\frac{3(x+1)}{3} = \frac{45}{3}$ (Dividing by 3)

$x + 1 - 15$

$x = 14$

$x + 1 = 14 + 1$

= 15

$x + 2 = 14 + 2$

= 16

14 + 15 + 16 = 45 (Hence, the numbers are 14, 15 and 16)

14. Ram's age = 3 × Krishna's age

Sum of their age = 56

Krishna's age	Ram's age	Sum of their ages
10	10 × 3 = 30	10 + 30 = 40
11	11 × 3 = 33	11 + 33 = 43
12	12 × 3 = 36	12 + 36 = 48
13	13 × 3 = 39	13 + 39 = 52
14	14 × 3 = 42	14 + 42 = 56

Hence, Krishna's age is 14 and Ram's age is 42.

15. Length = 2cm + Breadth

Perimeter of rectangle = 2(Length + Breadth)

= 28cm

Breadth	Length	Perimeter 2 (Length + Breadth)
4cm	4 + 2 = 6cm	2(4 + 6)cm = 2(10) cm = 20cm
5cm	5 + 2 = 7cm	5(5 + 7)cm = 2(12) cm = 24cm
6cm	6 + 2 = 8cm	2(6 + 8)cm = 2(14) cm = 28cm

Hence, Length and Breadth of the rectangle is 8cm & 6cm respectively.

Review Exercise

1. (a) Let the number be x

6 more than number = x + 6

Divided by 2 = $\frac{x + 6}{2}$

(b) Let the number be x

Half of the number = $\frac{1}{2} \times x = \frac{1}{2}x$

Decreased by 7 = $\frac{1}{2}x - 7$

(c) y multiplied by 2: $y \times 2 = 2y$

Added to 3 times $x = 2y + 3 \times x$

$= 2y + 3x$

(d) 5 added to 6 times $y = 5 + 6 \times y$

$= 5 + 6y$

(e) 2 time the reciprocal of $x = 2 \times \frac{1}{x}$

$= \frac{2}{x}$

Added to x times the reciprocd of 2

$= \frac{2}{x} + x \times \frac{1}{2}$

$= \frac{2}{x} + \frac{x}{2}$

2. (a) Let the first number be x

Other number is consecutive, therefore the number will be x + 1

Product of Consecutive numbers = x(x + 1)

16 subtracted from the product = x (x + 1) – 16

Product = 56

Hence, x(x + 1) – 16 = 56

(b) Let the first number be x

Other 2 numbers are consecutive numbers so, they will be as (x + 1), (x + 1 + 1) = (x + 2)

Sum of the numbers is equal to 30

x + (x + 1) + (x + 2) = 30

(c) Let the first even number be x

Other 2 Numbers are conscective even numbers so we will add 2 to make the numbers even.

Hence, the number will be as

(x + 2), (x + 2 + 2) = (x + 4)

Sum of the numbers equal to 42.

x + (x + 2) + (x + 4) = 42

= 3× + 7 = 42

(d) Let the first odd number be x

Other 2 consecutive numbers will also be odd, so in order to make them odd we will add 2. Therefore, the numbers will be (x + 2), (x + 2 + 2) = x + 4

Sum of numbers is equal to 51.

x + (x + 2) + (x + 4) = 51

3x + 7 = 51

3. Given: Jagan's age = y years old

Jagjit's age = Twice of Jagan's age

2x Jagan's age = 2 × y

= 2y

Hence, Jagjit's age is 2y

4. Given: Pranav's age = x years old

Lily's age = 5 times Pranav's age increased by 7

5 times pranav's age = 5 × x = 5x

Increase by 7 = 5x + 7

Hence, Lily's age is 5x +7

5. (a) 4abc, –4ab

(b) –3mn, 4np, -5pm

(c) 3y, –5t, 2z

(d) 2ab, 3c, –2p, 2q

6. (a) Amount of money = Sum of investment and interest

$A = P + I$

(b) Sum of the angles of $\Delta ABC = 180°$

$\angle A + \angle B + \angle C = 180°$

(c) Time is obtained by dividing distance from the rate.

$\text{Time} = \frac{\text{Distance}}{\text{Rate}}$

$t = \frac{d}{r}$

7. (a) $x - 5 = 7$

$x - 5 + 5 = 7 + 5$ (Adding 5 to both the sides)

$x = 12$

(b) $3x + 18 = 48$ (Subtracting 18 from to both the side

$3x + 18 - 18 = 48 - 18$

$3x = 30$

$\frac{3x}{3} = \frac{30}{3}$ (Dividing 3 from both the sides)

$x = 10$

(c) $2x = 48$

$\frac{2x}{2} = \frac{48}{2}$ (Dividing 2 from both the sides)

$x = 24$

(d) $5(x + 1) + 3 = 23$

$5(x + 1) + 3 - 3 = 23 - 3$ (Subtracting 3 from both the side)

$\frac{5(x + 1)}{5} = \frac{20}{5}$

(Dividing 5 from both the sides)

$x + 1 = 4$

$x = 4 + 1$

$x = 5$

(e) $7x - 4 = 10$

$7x - 4 + 4 = 10 + 4$ (Adding 4 to both the sides)

$7x = 14$

$\frac{7x}{7} = \frac{14}{7}$ (Dividing 7 from both the sides)

$x = 2$

(f) $96 + x = 300$

$96 + x - 96 = 300 - 96$ (Subtracting 96 from both the sides)

$x = 204$

(g) $4x + 3 = 2x + 11$

$4x + 3 - 3 = 2x + 11 - 3$ [Subracting 11 from both the sides]

$4x = 2x + 8$

$4x - 2x = 8$

$2x = 8$

$\frac{2x}{2} = \frac{8}{2}$ (Dividing 2 from both the sides)

$x = 4$

8. (a) $3a + 8 = 2a + 9$

$3a + 8 - 2a =$ (Subtacting 2 a from both the sides)

$a + 8 = 9$

$a + 8 - 8 = 9 - 8$ (Subtracting 8 from both the sides)

$a = 1$

(b) $2b - 8$

$\frac{2b}{2} = \frac{8}{2}$ (Dividing 2 from both the sides)

$b = 4$

(c) $9x = 8x + 4$

$9x - 8x = 8x + 4 - 8x$ (Subtracting 8x from both the sides)

$x = 4$

(d) $7x - 7 = 6x - 9$

$7x - 7 - 6x = 6x - 9 - 6x$ (Subtracting 6x from both the sides)

$x - 7 = -9$

$x - 7 + 7 = -9 + 7$ (Adding 7 to both the sides)

$x = -2$

(e) $2x + 2 = x + 7$

$2x + 2 - 2 = x + 7 - 2$

$2x = x + 5$

$2x - x = x + 5 - x$ (Subtracting 2 from both the sides)

$x = 5$

(f) $4p - 2 = 3p - 7$

$4p - 2 - 3p = 3p - 7 - 3p$ (Subtracting 3p from both the sides)

$p - 2 = -7$ (Adding 2 to both the sides)

$p - 2 + 2 = -7 + 2$

$p = -5$

9. (a) $5x + 8 = 23$

$5x + 8 - 8 = 23 - 8$ (Subtracting 8 from both the sides)

$5x = 15$

$\frac{5x}{5} = \frac{15}{5}$ (Dividing 5 from both the sides)

$x = 3$

(b) $2y - 4 = 8$

$2y - 4 + 4 = 8 + 4$ (Adding 4 to both the sides)

$2y = 12$

$\frac{2y}{2} = \frac{12}{2}$ (Dividing 2 from both the sides)

$y = 6$

(c) $2(t + 1) + 15 = 3$

$2t + 2 + 15 = 3$

$2t + 17 = 3$

$2t + 17 - 17 = 3 - 17$ (Subtracting 17 from both the sides)

$2t > -14$

$\frac{2t}{2} = \frac{-14}{2}$ (Dividing 2 from both the sides)

$t = -7$

(d) $-y + 46 = 3$

$-y + 46 - 46 = 3 - 46$ (Subtracting 48 from both the sides)

$-y = -43$

$-(-y) = -(-43)$ (Subtracting both the sides)

$y = 43$

(e) $2x + 3 = 3$

$2x + 3 - 3 = 3 - 3$ (Subtracting 3 from)

$2x = 0$

$\frac{2x}{2} = \frac{0}{2}$ (Dividing 2 from both the sides)

$x = 0$

(f) $2y - 3 = 3$

$2y - 3 + 3 = 3 + 3$ (Adding 3 to both the sides)

$2y = 6$ (Dividing 2 from both the sides)

$\frac{2y}{2} = \frac{6}{2}$

$y = 3$

10. (a) $y + 6 = 19$

$y + 6 - 6 = 19 - 6$ (Subtracting 6 from both the sides)

$y = 13$

(b) 20 less than a number $r = r - 20$

$r - 20 = 40$

$r - 20 + 20 = 40 + 20$ (Adding 20 to both the sides)

$r = 60$

(c) y decreased by $40 = y - 40$

$y - 40 = 20$

$y - 40 + 40 = 20 + 40$

(Adding 40 to both the sides)

$y = 60$

(d) 24 plus a number $x = x + 24$

$x + 24 = 10$

$x + 24 - 24 = 10 - 24$ (Subtracting 24 from both the sides)

$x = -14$

(e) Thrice a number $x = 3 \times x = 3x$

$3x = 21$

$\frac{3x}{3} = \frac{21}{3}$ [Dividing 3 from both the sides].

$x = 7$

(f) Let the number be x

Number multiplied by $3 = x \times 3 = 3x$

$3x = 36$

$\frac{3x}{3} = \frac{36}{3}$ (Dividing 3 from both the side)

$x = 12$

Answer: The number is 12.

(g) Twice a number of $p = p \times 2 = 2p$

$2p + 4 = 17$

$2p + 4 - 4 = 17 - 4$ (Subtract 4 from both the sides)

$2p = 13$

$\frac{2p}{2} = \frac{13}{2}$ (Dividing 2 from both the sides)

$p = \frac{13}{2}$

(h) Twice a number $c = 2 \times c = 2c$

$2c - 2 = 20$

$2c - 2 + 2 = 20 + 2$ (Adding 2 to both the sides)

$2c = 22$

$\frac{2c}{2} = \frac{22}{2}$ (Dividing 2 from both the sides)

$c = 11$

(i) Let the number be x

Multipled by 2: $2 \times x = 2x$

Increase by $4 = 2x + 4$

Number multiplied by $3 = x \times 3 = 3x$

Decreased by $9 = 3x - 9$

$2x + 4 - 2x = 3x - 9 - 2x$ (Subtracting 2x from the both the sides)

$x - 9 = 4$

$x - 9 + 9 = 4 + 9$ (Adding 9 to both sides).

$x = 13$

(j) Let the number be x

Number divided by $2 = \frac{x}{2}$

Decreased by $4 = \frac{x}{2} - 4$

$\frac{x}{2} - 4 = 9$ (Subtract 9 from both the sides)

$\frac{x}{2} - 4 - 9 = 0$

$\frac{x}{2} - 13 = 0$

$\frac{x}{2} - 13 + 13 = 0 + 13$ (Adding 13 to both the sides)

$\frac{x}{2} = 13$

$\frac{x}{2} \times 2 = 13 \times 2$ (Multiplying 2 from both the sides)

$x = 26$

11. (a) $+7x = 49$

$\frac{7x}{7} = \frac{49}{7}$ (Dividing 7 from both the sides)

$x = 7$

(b) $28 = +7k$

$\frac{28}{7} = \frac{7k}{7}$ (Dividing 7 from both the sides)

$k = 4$

(c) $+2x = 1$

$\frac{2x}{2} = \frac{1}{2}$ (Dividing 2 from both the sides)

$x = \frac{1}{2}$

(d) $4y = 20$

$\frac{4y}{4} = \frac{20}{4}$ (Dividing 4 from both the sides)

$y = 5$

(e) $+y = +32$

$y = 32$

(f) $-2x = 1$

$\frac{-2x}{-2} = \frac{1}{-2}$ (Dividing –2 from both the sides)

$x = \frac{-1}{2}$

(g) $9x = 36$

$\frac{9x}{9} = \frac{36}{9}$ (Dividing 9 from both the sides)

$x = 4$

(h) $\frac{x}{6} = 5$

$\frac{x}{6} \times 6 = 5 \times 6$ (Multiplying 6 from both the sides)

$\frac{6x}{6} = 30$

$x = 30$

(i) $\frac{x}{2} = -3$

$\frac{x}{2} \times 2 = -3 \times 2$ (Multiplying 2 from both the sides)

$\frac{2x}{2} = -6$

$x = -6$

(j) $\frac{x}{+3} = -4$

$\frac{x}{3} \times 3 = -4 \times 3$

(Multiplying 3 from both the sides)

$\frac{3x}{3} = -12$

$x = -12$

(k) $\frac{x}{7} = -2.6$

$\frac{x}{7} \times 7 = -2.6 \times 7$ (Multiplying 7 from both the sides)

$\frac{7x}{7} = -78.2$

$x = -18.2$

(l) $\frac{x}{6} = 2$

$\frac{x}{6} \times 6 = 2 \times 6$ (Multiplying 6 from both the sides)

$\frac{6x}{6} = 12$

$x = 12$

12. Length = 3 × Breadth

Perimeter = 2(Length + Breadth

400m = 2(3×Breadth + Breadth)

400m = 2(3 Breadth + Breadth)

$\frac{400}{2}$m = 4 Breadth

200m = 4 Breadth

Breadth = $\frac{200}{4}$m

Breadth = 50m

Length = 3 × Breadth

= 3 × 50m

= 150m

Answer: Hence, Length & Breadth are 150m & 50m respectively.

13. Number of girls = 120 + Number of boys

Total Studens = Number of girls + Number of boys

980 = (120 + Number of boys) + Number of boys

980 = 120 + 2×Number of boys

980 – 120 = 120 + 2×Number of boys - 120 (Subtracting 120 from both the sides)

$\frac{860}{2} = \frac{2 \times \text{Number of boys}}{2}$ (Dividing 2 from both the sides)

430 = Number of boys

Number of girls = 120 + Number of boys

= 120 + 430

= 550

Answer: There are 550 girls in the hostel.

14. Sanjay's age = 7 year old

Sanjay's aunty's age = 59 year old

Let the number of year be x

According to Question, Sanjay's aunty was 7 times old as Sanjay

so, we will subtract years from both of their ages.

7 times as old as Sanjay = 7(11 – x)

Sanjay Aunty's age = (59 – x)

: 59 – x = 7(11 – x)

59 – x = 77 – 7x (Adding x to both the sides)

59 – x + x = 77 – 7x + x

59 = 77 – 6x (Subracting 77 from both the sides)

59 – 77 = 77 – 6x –77

–18 = –6x

$\frac{-18}{6} = \frac{-6x}{6}$ (Dividing 6 from both the sides)

–x = –3

–(–x) = –(–3) (Subtracting both the sides)

x = 3

Multiple Choice Questions

1. (d) 7, as 7 is a numeral

2. n = 3, 3n – 1 = (3 × 3)–1 = 9 – 1 = 8 (b) 8

3. Profit = Selling price – Cost price

p = y – x (c) p = y –x

4. 12 multiplied by x = 12 × x = 12x (a) 12x

5. 12 subtracted from y = y –12 (b) y –12

6. Numerical Coefficient of xyz is 1 (d) 1

7. (b) $-15ab^2$

8. (d) 4

9. (c) Trinomial

10. weight of 1 book = 450g

Weight of x books = 450g × x

= 450x

Weight of 1 notebook = 350g

Weight of y notebooks = 350g × y

= 350y

Total Weight = 450x + 350y

(a) 450x + 350y

11. (c) 2x –7 < –7

Because, it is not equating 2 expression

12. x – 14 = 14

x – 14 + 14 = 14 + 14 (Adding 14 to both the sides)

x = 28

(a) 14

13. $\frac{x}{27} \times 27 = \frac{7}{3} \times 27$

x = 63

(a) 27

14. 7x – 14 = 5x + 14

7x – 14 + 14 = 5x + 14 + 14 (Adding 14 to from the both the sides)

7x = 5x + 28

7x – 5x = 28

2x = 28

$\frac{2x}{2} = \frac{28}{2}$ (Dividing 2 from both the sides)

x = 14

(b) 14

15. Let the number be x

26 times the number = 26 × x

= 26x

156 less than 26 times of a number = 26x – 156

26x – 156 = 26

26x – 156 + 156 = 26 + 156 (Adding 156 to both the sides)

26x = 182

$\frac{26}{26}x = \frac{182}{26}$ (Dividing 26 from both the side)

x = 7

(c) 7

16. Total money earned = ₹5000

Amount saved = ₹y

Money spent = Total money earned - Amonut saved

= ₹(5000 – y)

(d) ₹(5000 – y)

17. (c) z – 7

18. (d) x – 5 = 0 (As, it is equating 2 expressions)

19. Total amount distributed: ₹700

Number of children: x

Amount each children recieved:

$\frac{\text{Amount distributed}}{\text{Number of children}} = ₹\frac{700}{x}$ (b) $₹\frac{700}{x}$

20. $\frac{9c}{5}$ = F – 32 (F = 50)

$\frac{9c}{5} = 50 - 32$

$\frac{9c}{5} = 18$

$\frac{9c}{5} \times 5 = 18 \times 5$ (Multiplying 5 from both the sides)

90c = 90 (Dividing 9 from both the sides)

$\frac{9c}{9} - \frac{90}{9}$, c = 10

(c) 10

Check your Progress

1. Constant, Variable

(b) $5x - xy + 7$

$5 \times 5 - 5 \times 4 + 7$

$= 25 - 20 + 7$

$= 5 + 7 = 12$

2. Constant varibale

3. Like Terms

(d) $x \times 2 + y + 2$

$= 5 \times 2 + 4 + 3$

$= 10 + 7 = 17$

4. $x = 5, y = 4, z = 3$

(a) $x^2 + y + z$

$(5)^2 + 4 + 3$

$= 25 + 7 = 32$

(b) $5x - xy + 2$

$5 \times 5 - 5 \times 4 + 3$

$= 25 - 20 + 3$

$= 28 - 20 = 8$

5. (a) -5 (b) 5

(As they have fixed numerical value)

6. (a) $-5y^2z$ (b) 5 (c) y

7. (a) -7 (b) -1 (c) 1

(d) 9

8. (a) $8x^2yz + 5xy = 8 \times x \times x \times y \times z$ and $5 \times x \times y$

(b) $7x^2y + 3xy^2 - z = 7 \times x \times x \times y$, $3 \times x \times y \times y$, $z \times -1$

9. Number of boys = 4

Number of boys joined = y

Total number of boys = Number of boys + Number of boys joined

$= 4 + y$

Challenge

Charge for first km = ₹60

Charge for subsequent km = ₹15

Total km = X

Total Charge = Since, the fare for first km = ₹60

Subsequent kms = Total km– first km = X – 1

Fair for Subsequent kms = Total km - first km = X – 1

Fair for Subsequent kms = 15 (X – 1)

60 + 15 (X – 15) = (60 + 15x – 15)

= 15X – 45, Hence, the total change for the rest of the kms is

15x – 45

12 Ratio & Proportion

Exerice 12.1

1. (a) $6 : 9 = \frac{6 \div 3}{7 \div 7} = \frac{2}{3} = 2 : 3$

(b) $18 : 36 \ \frac{18 \div 18}{8 \div 4} = \frac{1}{2} = 1 : 2$

(c) $14 : 7 = \frac{14 \div 7}{7 \div 7} = \frac{2}{1} = 2 : 1$

(d) $36 : 8 = \frac{36 \div 4}{8 \div 4} = \frac{9}{2} = 9 : 2$

(e) $96 : 36 = \frac{96 \div 12}{36 \div 12} = \frac{8}{3} = 8 : 3$

2. (a) 8kg: 400g

8000g: 400g ($\therefore$ 1kg = 1000g)

8000 : 400 ($\therefore$ 8kg = 8000g)

$\frac{8000 \div 400}{400 \div 400} = \frac{20}{1} = 20 : 1$

(b) 48 minutes : 1 hour

48 minutes: 60 minutes (1 hours = 60 ,minutes)

$= \frac{48 \div 12}{60 \div 12} = \frac{4}{5} = 4 : 5$

(c) 2 meter: 35cm

200cm : 35cm (1m = 100cm)

200 : 35 (2m = 200cm)

$\frac{200 \div 5}{35 \div 5} = \frac{40}{7} = 40 : 7$

(d) 35 minutes to 45 second

1 minutes = 60 seconds

35 minutes = 60 seconds

35 minutes = (35 × 60)second

= 2100 seconds

2100 seconds : 45 seconds

2100 : 45

$\frac{2100 \div 15}{45 \div 15} = \frac{140}{3}$

= 140 : 3

(e) 2 dozen to 3Scores

1 dozen = 12 items

1 Scores = 20 items

$\therefore$ 3 Scores = 60 items

$\frac{24 \div 12}{60 \div 12} = \frac{2}{5}$

= 2 : 5

(f) 3 weeks to 3 days

1 weeks = 7 days

3 weeks = (7 × 3) day

= 21 days

21 days : 3 days

$\frac{21 \div 3}{3 \div 3} = \frac{7}{1} = 7 : 1$

(g) 48 minutes to 2 hours 40 minutes

1 hour = 60 minutes

2 hour 40 minutes = 120 minutes + 40 minutes

= 160 minutes

48 minutes : 160 minutes = $\frac{48}{160}$

$\frac{48 \div 16}{160 \div 16} = \frac{3}{10} = 3 : 10$

(h) 3m 5cm : 35

1m = 100cm

3m 5cm = 300cm + 5cm

= 305cm

305cm : 35cm

$\frac{305 \div 5}{35 \div 5} = \frac{61}{7}$

= 61 : 7

3. Number of girls = 20

Number of boys = 40

(a) Number of girls to Number of boys = 20 : 40

$\frac{20 \div 20}{40 \div 20} = \frac{1}{2} = 1 : 2$

(b) Total number of Student = Number of boys + Number of girls

= 40 + 20 = 60

Number of boys to total number of students

20 : 60

$\frac{20 \div 20}{60 \div 20} = \frac{1}{3} = 1 : 3$

4. (a) $3 : 4 = \frac{3}{4}$, $9 : 16 = \frac{9}{16}$

$\frac{3}{4}, \frac{9}{16}$ (LCM of 4 and 16 is 16)

$\frac{3}{4} = \frac{3 \times 4}{4 \times 4} = \frac{12}{16}$

$\frac{9}{16} = \frac{9 \times 1}{16 \times 1} = \frac{9}{16}$

$\frac{12}{16} > \frac{9}{16}$ (12 > 9)

Hence 3 : 4 > 9 : 16

(b) $15 : 16 = \frac{15}{16}$, $24 : 25 = \frac{24}{25}$

$\frac{15}{16}, \frac{24}{25}$ (Lcm of 16 and 25 is 400)

$\frac{15 \times 25}{16 \times 25} = \frac{375}{400}$, $\frac{24 \times 16}{25 \times 16} = \frac{384}{4}$ (375 < 384)

Hence 15 : 16 < 24 : 25

(c) $4 : 7 = \frac{4}{7}$, $5 : 8 = \frac{5}{8}$

$\frac{4}{7}, \frac{5}{8}$ (LCM of 7 and 8 is 56

$\frac{4 \times 8}{7 \times 8} = \frac{32}{56}$ (32 < 35)

Hence, 4 : 7 < 5 : 8

(d) $9 : 20 = \frac{9}{20}$ or $8 : 13\ \frac{8}{13}$

$\frac{9}{20}, \frac{8}{13}$ (LCM of 20 and 13 is 260)

$\frac{9 \times 13}{20 \times 13} = \frac{117}{260} < \frac{160}{260}$ (117 < 160)

Hence, 9 : 20 < 8 : 13

5. Poonam's income = ₹955

Poonam's saving = ₹185

Poonam's expenditure: Poonam's income – Poonam saving

= ₹(955 – 185)

= ₹770

(a) Saving to her income

= ₹185 : ₹955

$= \frac{185 \div 5}{770 \div 5} = \frac{37}{191} = 37 : 191$

(b) Saving to her expenditure

₹185 : ₹770

$= \frac{₹185 \div 5}{₹770 \div 5} = \frac{35}{154} = 35 : 1.154$

6. Length = 20m, Breadth = 15m

Ratio to length to Breadth

20m : 15m

$\frac{20 \div 5}{15 \div 5} = \frac{4}{3} = 4 : 3$

7. We are given that the number 351 is divided in the ratio 2:7.

Let the common factor of the ratio be k

Then the two numbers in which the 351 is divided are 2k and 7k.

Also, the sum of these two numbers will be equal to 351

2k + 7k = 351 = 9k = 351

Divide both sides by 9

k = 39

Substitute the value of k to find the value of two numbers.

2(39) = 78 and 7(39) = 273

8. Let the common factor of ratio be x.

8x + 7x = 60

15x = 60

$x = \frac{60}{15}$

x = 4

8x = 8 × 4 = 32

7 x = 7 × 4 = 32

Hence, the 2 numbers are 32 and 28.

9. Let the common factor of ratio of the 2 angle be x

2x + 3x = 90, 2x = 2 × 18 = 36

5x = 90 3x = 3 × 18 = 54

$x = \frac{90}{5}$

x = 18

Hence, the measure of each angle is 36 and 54.

10. Let the common factor of ratio of the 3 angles be x.

1x + 2x + 3x = 180

6x = 180

$x = \frac{180}{6}$

$x = 30$

$1x = 1 \times 30° = 30°$

$2x = 2 \times 30° = 60°$

$3x = 3 \times 30° = 90°$

Hence, the three angles of the traingle are 30, 60º and 90º respectively

11. Let the common factor of ratio between Kanak's childeren be x.

$5x + 3x = ₹1200$

$8x = ₹1200$

$x = \frac{₹1200}{8}$

$x = ₹150$

$5x = 5 \times ₹150 = ₹750$

$3x = 3 \times ₹150 = ₹450$

Hence, each child will get ₹750 & ₹450 respectively.

12. Let the Common factor of ration between Sania & Biju be x.

$5 : 7 = ₹1500$

$5x + 7x = 1500$

$12x = 1500$

$x = \frac{1500}{12}$

$x = 125$

$5x = 5 \times 125 = 625$

$7x = 7 \times 125 = 875$

Sania will get ₹625 and Biju will get ₹875

13. Number if Rose plants = 35 + Sunflower plants

Ratio of Rose to Sunflower plants

$= 8 : 3 = \frac{8}{3}$

Let the number of Sunflower plants be x.

Number of Rose plants = 35 + x

$= \frac{8}{3} = \frac{35 + x}{x}$

$8 \times x = 3(35 + x)$

$8x = 105 + 3x$

$8x - 3x = 105$

$5x = 105$

$x = \frac{105}{5}$

$x = 21$

Therefore Number of Rose plant bought by Sheila = x = 21

Number of Sumflower plant bought by Sheila = x + 35 = 21 + 35 = 56

14. (a) 6 : 11 or 9 : 14

$6 : 11 = \frac{6}{11}, 9 : 14 = \frac{9}{14}$

$\frac{6}{11}, \frac{9}{14}$ (LCM of 11 & 14 is 154)

$\frac{6 \times 14}{11 \times 14} = \frac{84}{154}, \frac{9 \times 11}{14 \times 11} = \frac{99}{154}$

$\frac{84}{154} < \frac{99}{154}$ [84 < 99]

Hence, 6 : 11 < 9 : 14

(b) 3 : 5 or 5 : 6

$3 : 5 = \frac{3}{5}, 5 : 6 = \frac{5}{6}$

$\frac{3}{5}, \frac{5}{6}$

(LCM of 5 and 6 is 30)

$\frac{3 \times 6}{5 \times 6} = \frac{18}{30}, \frac{5 \times 5}{6 \times 5} = \frac{25}{30}$

$\frac{18}{30} < \frac{25}{30}$ (18 < 25)

Hence, 3 : 5 < 5 : 6

(c) 2 : 5 or 3 : 7

$2 : 5 = \frac{2}{5}, 3 : 7 \frac{3}{7}$

$\frac{2}{5}, \frac{3}{7}$ (LCM of 5 and 7 is 35)

$\frac{2 \times 7}{5 \times 7} = \frac{14}{35}, \frac{3 \times 5}{7 \times 5} = \frac{15}{35}$

$\frac{14}{35} < \frac{15}{35}$ (14 < 15)

Hence, 2 : 5 < 3 : 7

15. Total number of studen in class VI (A) = 30

Total number of Student got 'A' grade in class VI (A) = 7

Ratio of Number of students who got 'A' grade in class VI (A) to Total number of Studens in class VI (A)

= 7 : 30

Total number of studen in class VI (A) = 35

Total number of Student got 'A' grade in class VI (B) = 8

Ratio of Number of students who got 'A' grade in class VI (B) to Total number of Studens in class VI (B) = 8: 35

$7: 30 = \frac{7}{30}, \frac{8}{35}$ (LCM of 30 and 35 is 210)

$\frac{7 \times 7}{30 \times 7} = \frac{49}{210}, \frac{8 \times 6}{35 \times 6} = \frac{48}{210}$

$\frac{49}{210} > \frac{48}{210}$

Therefore, $7: 30 > 8 : 34$

Hence, class VI (A) Students performed better than Clas VI (B)

Exercise 12.2

1. A number is in proportion when product of means = Product of extremes

(a) $8 : 1 : 6 : 12$

$\frac{8}{10} = \frac{6}{12}$ $8 \times 12 = 6 \times 16$

$96 = 96$

Hence, they are in proportion.

(b) $60g : 50g : : 180l : : 150l$

$\frac{60g}{50g} = \frac{180l}{150l} = 60 \times 150 = 50 \times 180$

$9000 = 9000$

Hence, they are in proportion

(c) $6 : 2 :: 4 : 3$

$\frac{6}{2} = \frac{4}{3} = 6 \times 3 = 18$

$2 \times 4 = 8$

$18 \neq 8$

Hence, they are not in proportion.

(d) 20 days : 1 year :: 60 days : 2 year

$\frac{20 \text{ days}}{1 \text{ year}} = \frac{60 \text{ days}}{2 \text{ year}} = 20 \times 2 = 60 \times 1$

$40 \neq 60$

Hence, they are not in proportion.

2. (a) $\frac{7}{14} = \frac{15}{x}$

$7 \times x = 15 \times 14$

$7x = 210, x = \frac{210}{7}, x = 30$

(b) $18 : x = 27 : 3$

$\frac{18}{x} = \frac{27}{3}, 18 \times 3 = 27 \times x$

$54 = 27x$

$x = \frac{54}{27}, x = 2$

(c) $x : 6 = 55 : 11$

$\frac{x}{6} = \frac{55}{11}$

$x \times 11 = 55 \times 6$

$11x = 330$

$x = \frac{330}{11}$

$x = 30$

(d) $x : 92 = 87 : 116$

$\frac{x}{92} = \frac{87}{116}$

$116x = 87 \times 92$

$116x = 8004$

$x = \frac{8004}{116}$

$x = 69$

3. $9: 150 : : 105 : 1350$

$\frac{9}{150} = \frac{105}{1350}$

$9 \times 1350 = 105 \times 150$

$12150 \neq 15750$

No, they are not in proportion

4. 4, x, 9 are in continued proportion therefore,

$4 : x :: x : 9$

$\frac{4}{x} = \frac{x}{9}$

$= 4 \times 9 = x \times x$

$36 = (x)^2$

$= x = 6$

Hence, the value of x is 6.

5. Time to cover 8km = 10 minutes

Let the time to cover 36km be x.

Distance : Distance : : Time : Time

$8 : 36 :: 10 : x$

$\frac{8}{36} = \frac{10}{x}$

$8 \times x = 10 \times 36$

$8 \times = 360$

$x = \frac{360}{8}$

$x = 45\text{min}$

Hence, the time to cover 36km is 45 minutes.

6. Let Sony Commission be x.

Ticket sold by Poonam: Tickets sold by Sonam : Poonam's commisions : Sony's commisions

60 : 96 :: ₹5 : x

$\frac{60}{96} = \frac{5}{x}$

60 × x = 96 × ₹5

60 × ₹480

$x = ₹\frac{480}{60}$

x = ₹8

Hence, Sony's commiosion is ₹8.

7. Let the rice required for 40 people be x

Weight of rice: Weigth of rice: Number of People: 20kg : x :: 100 : 40

$\frac{20}{x} = \frac{100}{40} = 20 \times 40 = 100 \times x$

$= 800 = 100x$

$x = \frac{800}{100}$

x = 8kg

8. Let the actual distance between according between A & C be x.

Actual Distance between A & B : Actual distance between A & C :: Map distance A & B: Map distance of A & C

50: x :: 4: 7

$\frac{50}{x} = \frac{4}{7} = 50 \times 7 = 4 \times x$

350 = 4x

$x = \frac{350}{4}$

x = 87.5km

Hence, actual distance between A and C is 87.5km

9. Let the map distance be x

Actual Distance between A & B : Actual Distance between A & C :: Map distance of A & B: Map distance of A & C

50 : 62 . 5 :: 4 : x

$\frac{50}{62.5} = \frac{4}{x}$

50 × x = 4 × 62.5

50x = 250.0

$x = \frac{250}{50}$

x = 5

Hence, the map distance between the is 5km.

10. Let the number of Crayons be x.

Number of packets: Number of Packets :: Cost of crayons : Cost of Crayons

24 : x :: 96 : 72

$\frac{24}{x} = \frac{96}{72} = 24 \times 72 = 96 \times x$

$= 1728 = 96x$

$x = \frac{1728}{96}$

x = 18

Answer: Rahul purchased 18 packets of crayons.

Exercise 12.3

1. Rent of room for 4 months = ₹4500

Rent of room for 1 month = $₹\frac{4500}{4}$ = ₹1125

Number of months in a year : 12 months

Rent of room for 12 month = ₹(125 × 12)

= ₹13,500

Thus, Rent of room for 12 months = ₹13,500

2. Cost of 30 pairs of gloves: ₹450

Cost of 1 pair of gloves : $₹\frac{450}{30}$ = ₹15

Cost of 16 pairs of gloves: ₹(15 × 16)

= ₹240

Answer: Cost of 16 pairs of gloves is ₹240

3. Time taken by Rohan to cover 45km : 54 minutes

Time taken by Rohan to cover 1 km: $\frac{54}{45}$ = 1.2 minutes

Time taken by Rohan to cover 70 km: (70 × 1.2)minutes

= 84 minutes (1hours = 60minutes

84 minutes = (60 + 24) minutes

= 1 hour 24 minutes

4. Cost of 40m of cloth : ₹200

Cost of 1m of cloth ₹$\frac{200}{40}$

= ₹5

Cost of 50m of cloth = ₹(50 × 5)

= ₹250

Answer: Cost of 50m of cloth is ₹250.

5. Number of Bananas in 1 dozen = 12

Number of Bananas in 4 dozen = 12 × 4 = 48

Cost of 4 dozens of Bananas = $\frac{60}{48}$ = ₹1.25

Number of Bananas can be purchased for

₹12.50 = $\frac{12.50}{\text{Cost of 1 Bananas}} = \frac{12.50}{1.25} = 10$

Hence, 10 bananas can be bought for ₹12.50

6. Disance covered in 3 hours: 195km

Distance covered in 1 hour = $\frac{195}{3}$km

= 65km

Distance covered in 5 hours = (65 × 5)km

= 325km

Answer: The train will cover 325km in 5 hours

7. We have 52 packets of 12 pencil.

So, we have total pencil =12 × 52

= 624

Now, 624 pencil costs 499.20₹

So, 1 pencil costs = 624

499.20

= 0.80₹

Here, 65 packet have 10 pencils each.

So, that pencils = 65 × 10

= 650 pencils.

Now, If 1 pencil costs 0.80₹

then 650 pencil costs =0.80 × 650

= 520₹

8. Number of bags: 25

Weight of each bag: 40kg

Total weight of bags : Number of bags × Weight of each bag

= (25 × 40)kg

= 1000kg

Cost of 40 bags weighing 1000kg = ₹2250

Cost of 1kg = $\frac{2250}{1000}$ = ₹2.250

Here, 35 bags weight 50kg each

Total weight = 35 × 50kg

= 1750kg

If cost of 1kg is ₹2.250

Cost of 1750kg = ₹2.250 × 1750

= ₹3937.50

Answer: Cost of 35 bags of wheat, each weighing 50kg is ₹3937.50.

9. (a) Weigth of 720 books: 9kg

Weight of 1 book = $\frac{9}{72}$kg

= 0.125

Weight of so such books: (0.125 × 80)kg

= 10kg

(b) Number of books in 1kg = $\frac{72}{9}$

= 8 books

Number of books in 6kg = 6 × 8

= 48 books

10. Let his monthly salary be x.

$\frac{3}{4}$ of x = 600

$\frac{3}{4}$x = 600, x = $\frac{\cancel{600}^{200} \times 4}{\cancel{3}_{1}}$

x = ₹800

Answer: Hence, his monthly salary is ₹800.

Review Exercise

1. (a) 88 : 28

= $\frac{88 \div 4}{28 \div 4} = \frac{22}{7}$

= 22 : 7

(b) 19 : 32

$\frac{19 \div 19}{38 \div 19} = \frac{1}{2}$

= 1 : 2

(c) 65 : 100

$\frac{65 \div 5}{100 \div 5} = \frac{13}{20}$

= 13 : 20

(d) 200m, 2km

1km = 1000m

2km = 2000m

200: 2000

$\frac{200 \div 200}{2000 \div 200} = \frac{1}{10}$

= 1 : 10

(e) 1kg, 500g

1kg = 1000g

1000 : 500

$\frac{1000 \div 500}{500 \div 500} = \frac{2}{1}$

= 2 : 1

(f) 50p, ₹30

1₹ = 100p

₹30 = (30 × 100)p

= 3000p

50 : 3000

$\frac{50 \div 500}{3000 \div 50} = \frac{1}{60}$

= 1 : 60

2. Cost of Pen: ₹10

Cost of pencil: ₹2

Cost of pen to the cost of pencil

= 10 : 2

$\frac{10 \div 5}{2 \div 2} = \frac{5}{1} = 5 : 1$

Hence, the ratio of the cost of a pen to the cost of a pencil is 5 : 1

3. Length of Rectangle: 2m (1m = 100cm)

2m = (2 x 100)cm = 200cm

Breadth of rectangle : 50 cm

Ration of Length to the breadth is 200: 50

$= \frac{200 \div 50}{50 \div 50} = \frac{4}{1} = 4 : 1$

4. Number of trees planted by Raman: 20 trees

Number of trees planted by Nalini: 24 trees

Number of trees planted by Gurpreet: 34 trees

(a) Ratio of number of trees planted by Raman to these planted by Nalini = 20 : 24

$= \frac{20 \div 4}{24 \div 4} = \frac{5}{6} = 5 : 6$

(b)Ratio of number of trees planted by Raman to these planted by Gurpreet

$= 20 : 34 = \frac{24 \div 2}{34 \div 2} = \frac{10}{17} = 10 : 17$

(c) Ratio of number of trees planted by Nalini to those planted by Gurpreet.

$24 : 34 = \frac{24 \div 2}{34 \div 2} = \frac{12}{17} = 12 : 17$

(d) Ratio of number of trees planted by Nalini to those planted by Raman

$= \frac{24 \div 4}{20 \div 4} = \frac{6}{5} = 6 : 5$

5. Let the electricity bill be x

so, the telephone bill will be 800 + x.

Ratio of electricity to telephone bill = 6: 16 = $\frac{6}{16}$

$\frac{6}{16} = \frac{x}{800 + x}$

16 × x = 6 (800 + x)

16x = 4800 + 6x

16x – 6x = 4800

10x = 4800

$x = \frac{4800}{10}$

x = 480

Hence, electricity bill i.e x is ₹480 telephone bill i.e x + 800

₹(480 + 800) = ₹1280

6. Let the common factor of the ratio be x

Accordingly, number of stamps with Ravi = 5x

Number of stamps with Puja = 4x

Number of stamps with Swati = 7x

Total number of stamps = 720

5x + 4x + 7x = 720

16x = 720

16x = 720

$x = \frac{720}{16}$, x = 45

Ravi = 5x = 5 × 45 = 225

Puja = 4x = 4 × 45 = 180

Swati = 7x = 7 × 45 = 315

Hence, Ravi, Puja and swati got 225, 180 and 315 stamps respectively.

7. (a) Proportion: Product of extremes = Product of means

$10 \times 45 = 30 \times 15$

$450 = 450$

Hence, they are in proportion

(b) 8 : 40 ::5 : 30

$8 \times 30 = 40$ ₹ 5

$240 \neq 200$

Hence, they are not in proportion

(c) 5 : 20 : : 75 : 3

$5 \times 3 = 20 \times 75$

$15 \neq 1800$

Hence, they are not in proportion.

(d) 1kg = 1000g

5kg = (2 × 1000)g

= 2000g

$50 \times 40 = 2000 \times 5$

$2000 \neq 10000$

Hence, they are not in proportion

8. (a) $x \times 30$

$x = \frac{30}{30}$

$x = 1$

(b) $2 \times 54 = x \times 18$

$108 = 18x$

$x = \frac{108}{18}$

$x = 6$

(c) $9 \times 21 = 63x$

$189 = 63x$

$x = \frac{189}{63}$

$x = 3$

(d) $6 \times x = 24 \times 4$

$6x = 96$

$x = \frac{96}{6}$

$x = 16$

9. Let the sugar ration for the family of 10 people be x.

Number of people in the family: Number of people in the family : Grams of sugar : Grams of sugar

8 : 10 :: 6400 : x

$8 \times x = 6400 \times 10$

$8x = 64000$

$x = \frac{64000}{8}$, $x = 8000$

Hence, the family of 10 people needs 8000g of sugar.

10. Cost of 8 toffees = ₹240

Cost of 1 toffees ₹$\frac{240}{8}$ = ₹40

Cost of 12 toffees = ₹(40 × 12)

= ₹480

Hence cost of 12 such toffees is ₹480

Multiple choice Questions

1. $35 : 84 = \frac{35 \div 7}{84 \div 7} = \frac{5}{12} = 5 : 12$

(c) 5 : 12

2. $20 : 15 = \frac{20 \div 5}{15 \div 5} = 4 : 3$ (a) 4 : 3

3. 1m = 100cm

1.5m = (1.5 × 100)cm

= 150cm

150cm to 10 cm

150: 10

$= \frac{150 \div 10}{10 \div 10} = \frac{15}{1} = 15 : 1$

(d) 15: 1

4. 1 hour = 60 minutes

1 minute = 60seconds

60 second = (60 × 60 seconds)

= 3600second

1 hour to 300 seconds

3600 seconds : 300 second

$\frac{3600 \div 300}{300 \div 300}$ $\frac{12}{1} = 12 : 1$

(b) 12 : 1

5. (b) middle terms

6. Number are in proption when product of extremes = Product of means

Means

12, 21, 72, 126

Extremes

$12 \times 126 = 21 \times 72$

Answer: (c) $12 \times 126 = 21 \times 72$

7. $7 : 12 = \frac{7 \times 6}{12 \times 6} = \frac{42}{72} = 42 : 72$

(d) 42 : 72

8. If they are in proption; then product of means = Product of extremes

Means

3: 18 :: x : 42

extremes

$18 \times x = 3 \times 42$

$18x = 126$

$x = \frac{126}{18}$, $x = 7$

(c) 7

9. Let the length of the rectangle be x.

Breadth = 7cm

Ration from length to Breadth = $3 : 1 = \frac{3}{1}$

$\frac{3}{1} = \frac{x}{7}$

$7 \times 3 = x \times 1$

$x = 21$

Hence, Length = 21cm

(d) 21cm

10. Number of books: Number of books :: Cost of books : Cost of books

Let the cost of 5 books be x

$12 : 5 :: 204 : x$

$12 \times x = 5 \times 204$

$12x = 1020$

$x = \frac{1020}{12}$

$x = 85$

(c) ₹85

11. Number of vowels in the word 'MATHEMATICS' = A, E, A, I = 4

Number of times T occurs in the word 'MATHEMATICS' = 2

Ratio of number T to the number of vowels

$= 2 : 4$

$\frac{2 \div 2}{4 \div 2} = \frac{1}{2} = 1 : 2$

(b) 1 : 2

12. (a) Proportion

13. a : c :: d :b

$a \times b = c \times b$

$\frac{ab}{c} = d$

Answer: (d) $d = \frac{ab}{c}$

14. $\frac{18}{x} = \frac{21}{56}$

$\frac{18}{x} = \frac{21}{56}$

$18 \times 56 = 21x$

$1008 = 21x$

$x = \frac{1008}{21} = 48$

$\frac{21}{56} = \frac{y}{40}$

$21 \times 40 = y \times 56$

$840 = y \times 56$

$y = \frac{840}{56}$

$y = 15$

$x : y = 48 : 15$

$= \frac{48 \div 3}{15 \div 3} = \frac{16}{5} = 16 : 5$

(b) 16 : 5

15. For dividing 96 into 2 whole numbers the sum of the terms of the ratio must be x factor of 96.

(b) 7 : 9 (Both 7 & 9 are factor of 96

16. 1 week = 7 days

3 weeks = (3 × 7)days

= 21 days

Ratio of 9 days ti 3 weeks

= 9 : 21

$= \frac{9 \div 3}{21 \div 3} = \frac{3}{7} = 3 : 7$

(c) 3 : 7

17. Number of Consonants in the word 'MATHEMATICS'

= M, T, H, M, T, C and S = 7

Number of vowels in the word 'MATHEMATICS': A, E, A, I

= 4

Ratio of number of consonants to number of vowels

= 7 : 4

(b) 7 : 4

18. Length = $\frac{1}{2}$m

Width = $\frac{3}{4}$m

Ratio of width to Length

Width/Length

$= \frac{3}{4} \div \frac{1}{2}$

$\frac{3}{4} \times \frac{2}{1} = \frac{6}{4} = \frac{6 \div 2}{4 \div 2} = \frac{3}{2}$

$= 3 : 2$ (a) 3 : 2

19. Let the cost of 12 rolls box

Number of rolls of cello tape: Number of rolls of cello tape : : Cost of 3 rolls : Cost of 12 rolls

$= 3 : 12 : : 48 : x$

$3 \times x = 12 \times 48$

$3x = 576$

$x = \frac{576}{3}$, $x = 192$

(c) ₹192

20. Weight of 15 iron balls: 10kg 509g = 10.509kg (1kg = 1000g)

10kg 509g = (10 × 1000)g + 509g

= (10000 + 509)g

= 10509g

Weight of 1 ball = $\frac{10509}{15}$ = 700.6g

Number of balls in 4kg 690g = 4kg 690g = $\frac{4960g}{700.6g}$ = 7balls (Approve)

(d) 7 balls

Check your Progress

1. Ratio is unitless

2. No

3. $4 : 30 = \frac{4 \div 2}{30 \div 2} = \frac{2}{15} = 2 : 15$

4. (To be in Proportion product of extremes should be equal to product of means)

$1 \times 4 = 2 \times 3$

$4 \neq 6$

Hence, it is not in proportion

5. (To be in Proportion product of extremes should be equal to product of means)

$2 \times 12 = 4 \times 6$

$24 = 24$

Hence, it is in proportion

6. (To be in Proportion product of extremes should be equal to product of means)

$1 \times 4 = 2 \times 2$

$4 = 4$

Hence, it is in proportion

7. $2 \times 6 = 3 \times x$

$12 = 3x$

$x = \frac{12}{3}$

$x = 4$

8. Let the cost of 3 pen box

Number of pens: Number of pens

:: Cost of 5 pens : Cost of 3 pens

$= 5 : 3 : : 15 : x$

$5 \times x = 3 \times 15$

$5x = 45$

$x = \frac{45}{5}$

$x = 9$

Hence, the cost of 3 pens is ₹9.

9. $2 : 3 = \frac{2}{3}$, $4 : 6 = \frac{4}{6}$

$\frac{2}{3} = \frac{4}{6} = 2 \times 6 = 4 \times 3$

$12 = 12$

Hence, 2 : 3 and 4 : 6 are in proportion.

10. Let the money saved in 4 month be x.

Number of month in an year = 12

Saving : Saving : : Time : Time

$6000 : x : : 12 : 4$

$6000 \times 4 = 12x$

$x = \frac{24000}{12}$

$x = 2000$

Hence, the saving in 1 year is ₹2000.

Challenge

1. Number of prime number between 1 to 50: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43 and 47 = 15

Number of Composite numbers between 1 to 50: 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 38, 39, 40, 42, 44, 45, 46, 48, 49, 50

= 39

Ratio of prime numbers to composite numbers between 1 & 50 = 15 : 34

2. Let the ratio of the two wires be x.

5:14 = 5x, 14x

If the 2 wires joined together, then the length of total wire

= 5x + 14x = 19x

Ratio of 1st piece of wire to the total length of wire

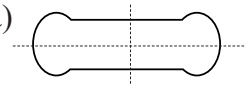
$= 5x: 19x = \frac{5x}{19x} = \frac{5}{19} = 5:19$

Ratio of 2nd piece of wire to the total length of wire

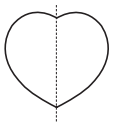
$= 14x : 19x = \frac{14x}{19x} = \frac{14}{19} = 14:19$

13 Symmetry

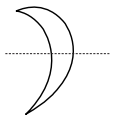
Exericse 13.1

1. (a) 

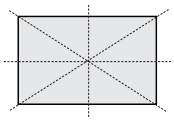
2

(b) 

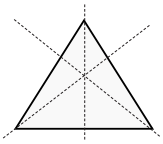
2

(c) 

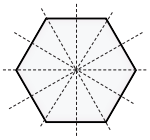
2

(d) 

2

(e) 

3

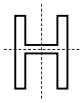
(f) 

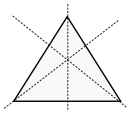
6

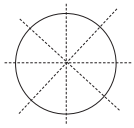
2. (a)  = 1

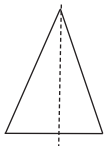
(b)  = 1

(c)  = 1

(d)  = 1

(e)  = 3

(f)  = Infinite

(g)  = 1

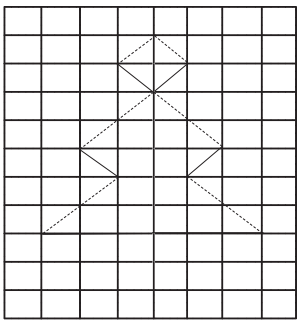
3. (a) A, B, C, D, E, I, M, T, U, V, W

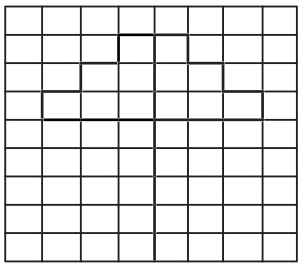
(b) H, I, X, O7

(c) F, G, J, K, L, N, P, Q, R, S, Y, Z

(d) To be done by Students

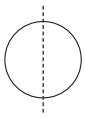
Exercise 13.2

1. (a) 

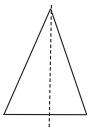
(b) 

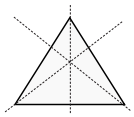
2. (a) 2 (b) 1

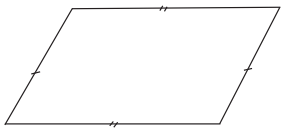
(c) 1 (d) 5

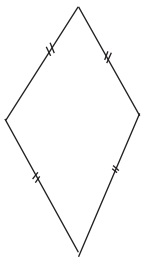
3. 

4. G, J and L

5. (a)  (b) 

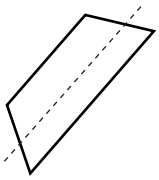
(c) 

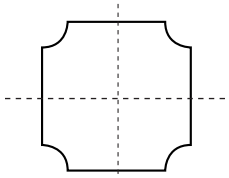
7.  = Parallelogram

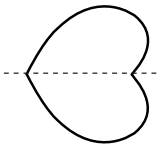
 = kite

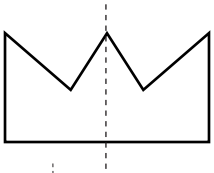
 = Square

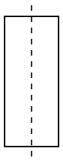
Review Exercise

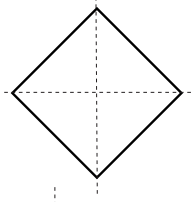
1. (a) 

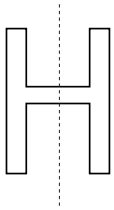
(b) 

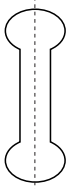
(c) 

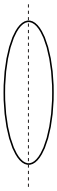
(d) 

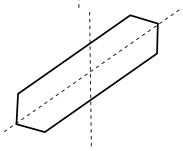
(e) 

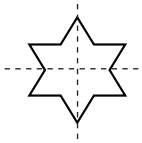
(f) 

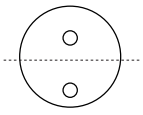
(g) 

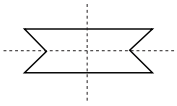
(h) 

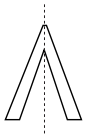
(i) 

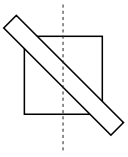
(j) 

(k) 

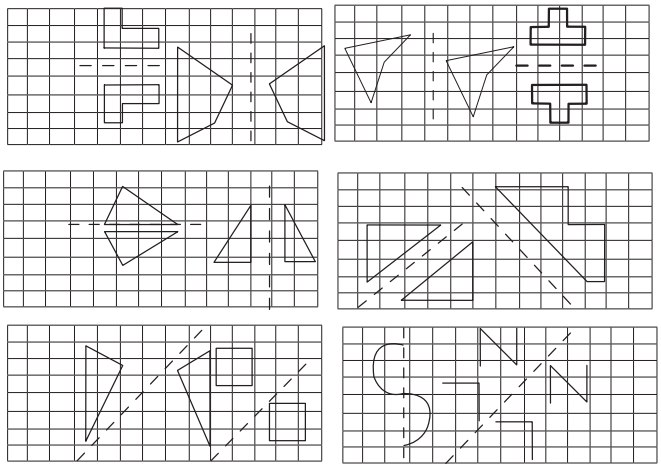
(l) 

(m) 

(n) 

(o) 

2. (a) No (b) 3
(c) 2 (d) 4
(e) Infinite

3. 

Multiple Choice Question

1. (b) Vertical line of symmetry
2. (a) 1
3. (c) Three lines of symmetry
4. (d) No lines of symmetry
5. (c) Infinite number of lines of Symmetry
6. (c) Z
7. (c)
8. (b) 2
9. (c) x
10. (c) 0

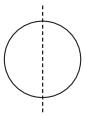
Check Your Progress

1. Yes
2. 1
3. 0
4. 2
5. 5
6. 1

Challenge

1. From 0 to 9, only 0, 1, 3 and 8 are symmetrical. Hence, the 3-digit number formed by them are 138, 380, 130.

2. (a) U = 

(b) O = 

14 Practical Geometry

Exercise 14.1

1. (a) AB

(b) Both are equal

(c) LM

2. (a) ⟷ 3.6cm

(b) ⟷ 3.6cm

(c) ⟷ 3cm

(d) ⟷ 3.5cm

3. (a) AB = 3cm, CD = 4cm

AB + CD = (3 + 4)cm = 7cm

⟷ 7cm

(b) PQ = 3cm

RS = 2cm

PQ + RS = (3 + 2)cm

= 5cm

⟷ 5cm

(c) MN = 2cm, OP = 4cm

MN + OP = 2cm + 4cm

= 6cm

⟷ 6cm

4. r = 4cm

s = 2.5cm

t = 3cm

(a) (r + s) = (2 + 2.5)cm

= 4.5cm

⟷ 4.5cm

(b) (2r + s) = (2 × 2cm + 2.5cm)

= (4 + 2.5)cm = 6.5cm

⟷ 6.5cm

(c) (r + s + t)

= (2 + 2.5 + 3)cm

⟷ 7.5cm

(d) 3r + 3

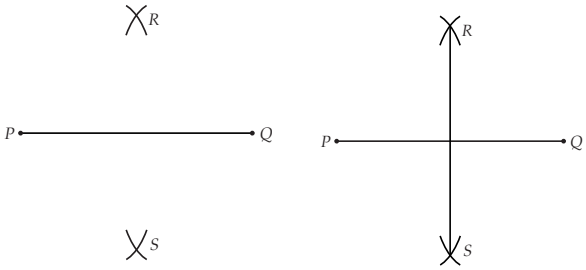
= (3 × 3 + 25)cm

= (9 + 2.5)cm

= 11cm

⟷ 11cm

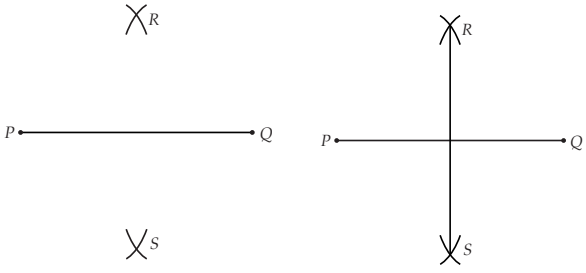
5.



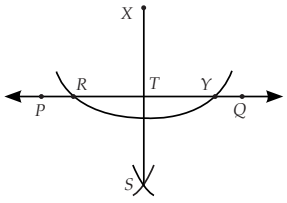
1. Draw a line segment $\overline{PQ}$ of given length.
2. Place the needle of the compasses on P and with radius more than half the length of $\overline{PQ}$, draw two arcs on either side of $\overline{PQ}$.
3. Now, place the compasses at Q and with the same radius as in Step 2, draw two arcs on either side of $\overline{PQ}$ such that they intersect the previously drawn arcs at R and S.
4. Join R and S to cut the segment $\overline{PQ}$ at T.

The point T divides the segment $\overline{PQ}$ into two equal halves and angle $RTQ = 90°$.

6.

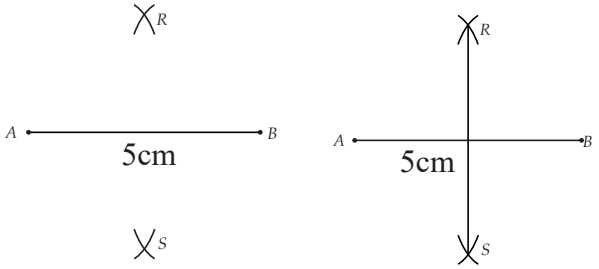


7.



1. Draw a line $\overline{PQ}$.
2. Select a point X outside the line.
3. With X as centre and a radius long enough to intersect the line $\overleftrightarrow{PQ}$ at two distinct places, draw an arc intersecting $\overleftrightarrow{PQ}$ at R and Y.
4. Now, with R and Y as centres and the same radius, draw two arcs to intersect each other at S.
5. Join XS intersecting $\overleftrightarrow{PQ}$ at T. $\overrightarrow{XT}$ is the required perpendicular to $\overleftrightarrow{PQ}$.

8.

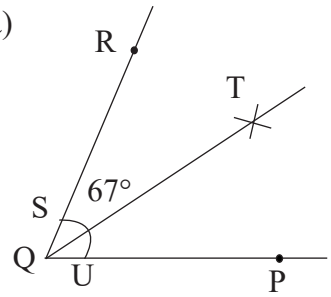


1. Draw a line segment $\overline{AB}$ of given length.
2. Place the needle of the compasses on A and with radius more than half the length of $\overline{AB}$, draw two arcs on either side of $\overline{AB}$.
3. Now, place the compasses at B and with the same radius as in Step 2, draw two arcs on either side of $\overline{AB}$ such that they intersect the previously drawn arcs at R and S.
4. Join R and S to cut the segment $\overline{AB}$ at T.

The point T divides the segment $\overline{AB}$ into two equal halves and angle $RTB = 90°$.

Exercise 14.2

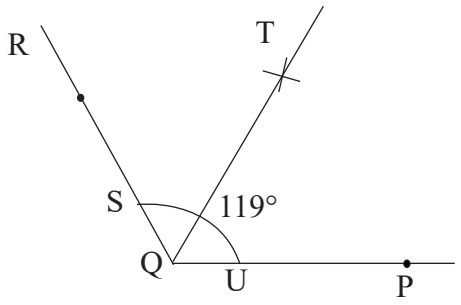
1. (a)



Draw an angle RQP of 67°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U ans s.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at T.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR

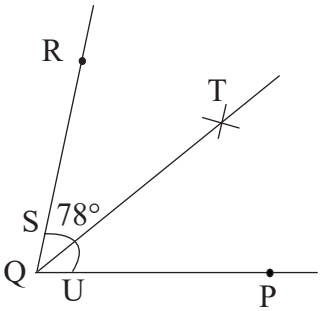
(b)



Draw an angle RQP of 119°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at T.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

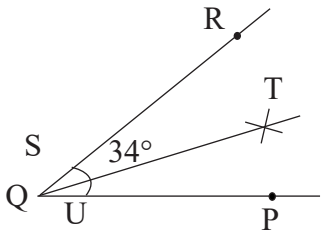
(c)



Draw an angle RQP of 78°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at T.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

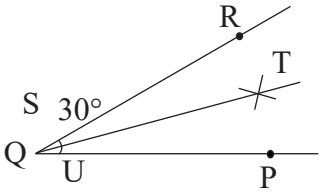
(d)



Draw an angle RQP of 34°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

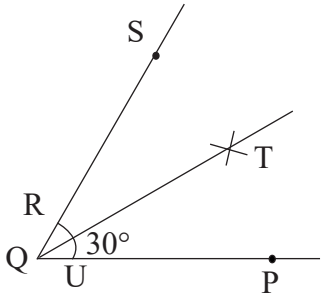
2. (a)



Draw an angle RQP of 30°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

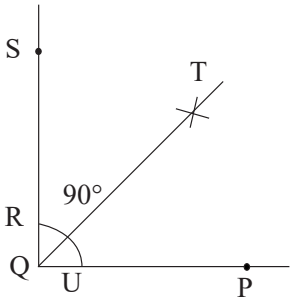
(b)



Draw an angle RQP of 60°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

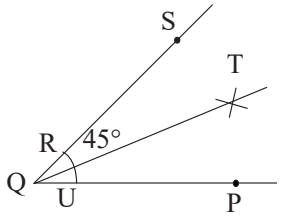
(c)



Draw an angle RQP of 90°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

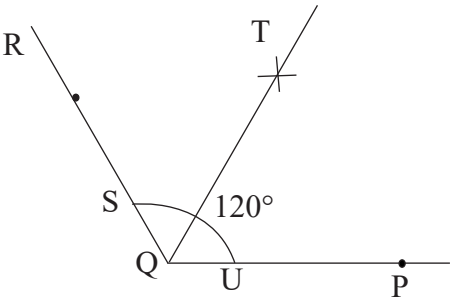
(d)



Draw an angle RQP of 45°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

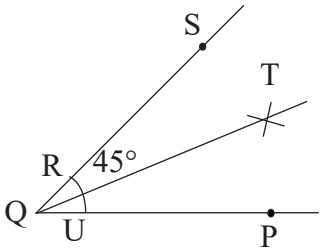
(e)



Draw an angle RQP of 120°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

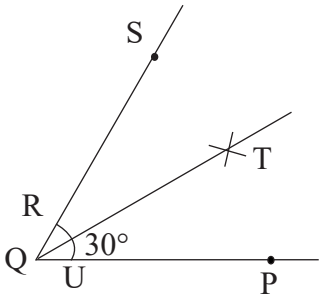
3.



Draw an angle RQP of 45°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

4.



Draw an angle RQP of 60°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

Review Exercise

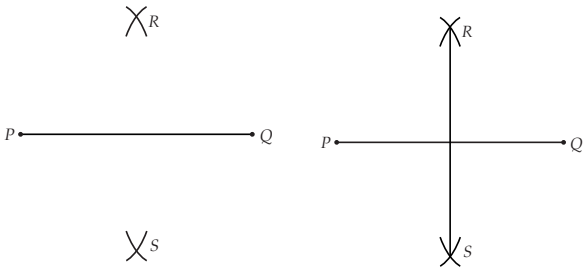
1. (a)

12.6cm

(b)

9.1cm

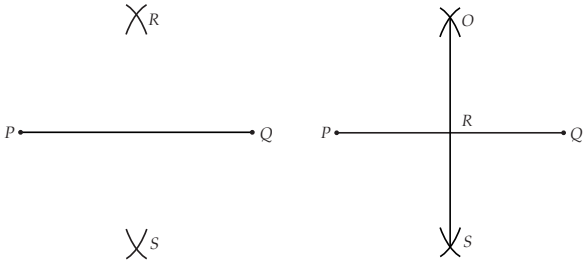
2.



1. Draw a line segment $\overline{PQ}$ of 7cm.
2. Place the needle of the compasses on *P* and with radius more than half the length of $\overline{PQ}$, draw two arcs on either side of $\overline{PQ}$.
3. Now, place the compasses at *Q* and with the same radius as in Step 2, draw two arcs on either side of $\overline{PQ}$ such that they intersect the previously drawn arcs at *R* and *S*.
4. Join *R* and *S* to cut the segment $\overline{PQ}$ at *T*.

   The point *T* divides the segment $\overline{PQ}$ into two equal halves and angle *RTQ* = 90°.

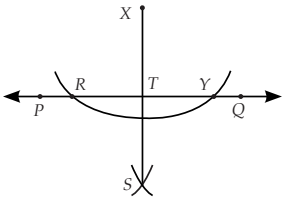
3.



1. Draw a line segment $\overline{PQ}$ of 9cm.
2. Place the needle of the compasses on *P* and with radius more than half the length of $\overline{PQ}$, draw two arcs on either side of $\overline{PQ}$.

3. Now, place the compasses at Q and with the same radius as in Step 2, draw two arcs on either side of $\overline{PQ}$ such that they intersect the previously drawn arcs at O and S.
4. Join O and S to cut the segment $\overline{PQ}$ at T. The point T divides the segment $\overline{PQ}$ into two equal halves and angle $OTQ = 90°$.
5. Hence, point R is the bisector of line PQ. Thus $PR = QR$.

4.



1. Draw a line $\overline{PQ}$ of length 7cm.

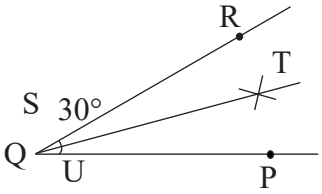
2. Select a point X outside the line.

3. With X as centre and a radius long enough to intersect the line $\overleftrightarrow{PQ}$ at two distinct places, draw an arc intersecting $\overleftrightarrow{PQ}$ at R and Y.

4. Now, with R and Y as centres and the same radius, draw two arcs to intersect each other at S.

5. Join XS intersecting $\overleftrightarrow{PQ}$ at T. $\overrightarrow{XT}$ is the required perpendicular to $\overleftrightarrow{PQ}$.

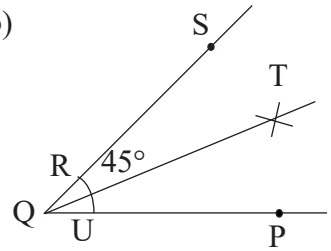
5. (a)



Draw an angle RQP of 30°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at T.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

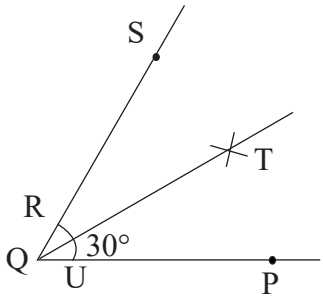
(b)



Draw an angle RQP of 45°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at T.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

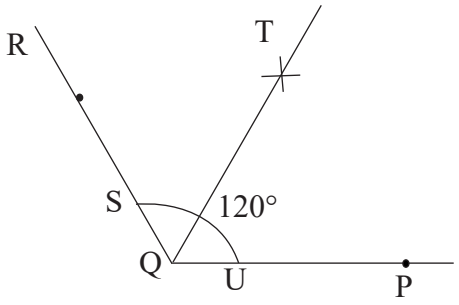
(c)



Draw an angle RQP of 60°

1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at T.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

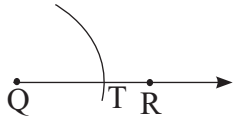
(d)



Draw an angle RQP of 120°

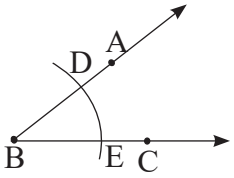
1. Place your compasses on point Q and draw an arc to interesct the two arms of the angle U and S.
2. Using U and S as Centres and with equal radii, draw two small arcs that interesect each than at *T*.
3. Join $\overrightarrow{QT}$. It is the bisector of ∠PQR, and m ∠PQT = m ∠TQR.

6.



To construct ∠PQR to be equal in measure to given ∠ABC the 1st step is:

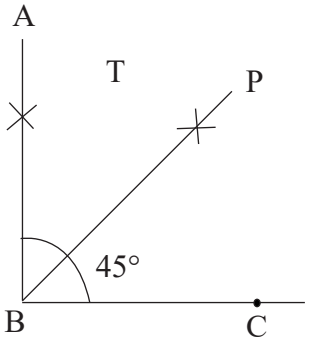
1) Place the compass point at vertex B of ∠ABC and talking a convenient distance, draw an arc to cut the rays BA and BC at points D and E repectively.



Draw ray QR.

Using the same distance again, place the compass point Q of ray QR and draw an arc. Let this arc cut the ray QR at T.

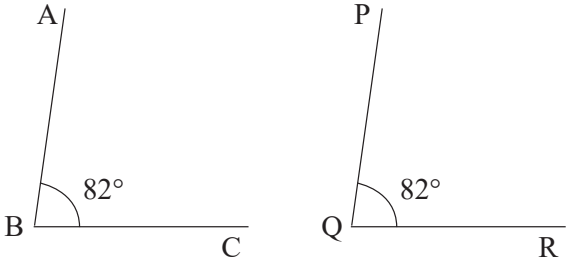
7.



On measuring ∠PBC = 45°

1. Contruct a right angle ABC
2. Put the sharp end of your compass at point B and make one arc on the line BC and another arc on line AB
3. Without changing the width of your compass, put the sharp end of the compass es at the arc on BC and make and arc within the line AB and BC. Do the same at the arc on AB and make sure that the second arc intersects the first arc. Name the point of intersection as P.
4. Draw a line from point B to the points of intersection of the 2 arcs. This line bisects the ∠ABC.

8.



1. Construct an angle ABC = 82°
2. Take | and mark a point D on it.
3. Fix the compass pointer on B and draw an arc which cuts the side ∠ABC at D and E.
4. Without changing the compass setting, place the pointer on P and draw an arc which cuts | at Q.
5. Open the compass equal to length DE.
6. Without disturbing the radius on the compass,

   place its pointer at Q and draw an arc which cuts the previous arc at R.

Multiple Choice Question

1. (d) none of these, as its shape is right angled isoscles triangle

2. (b) 90°

3. (d) Protactor

4. (d) all of these