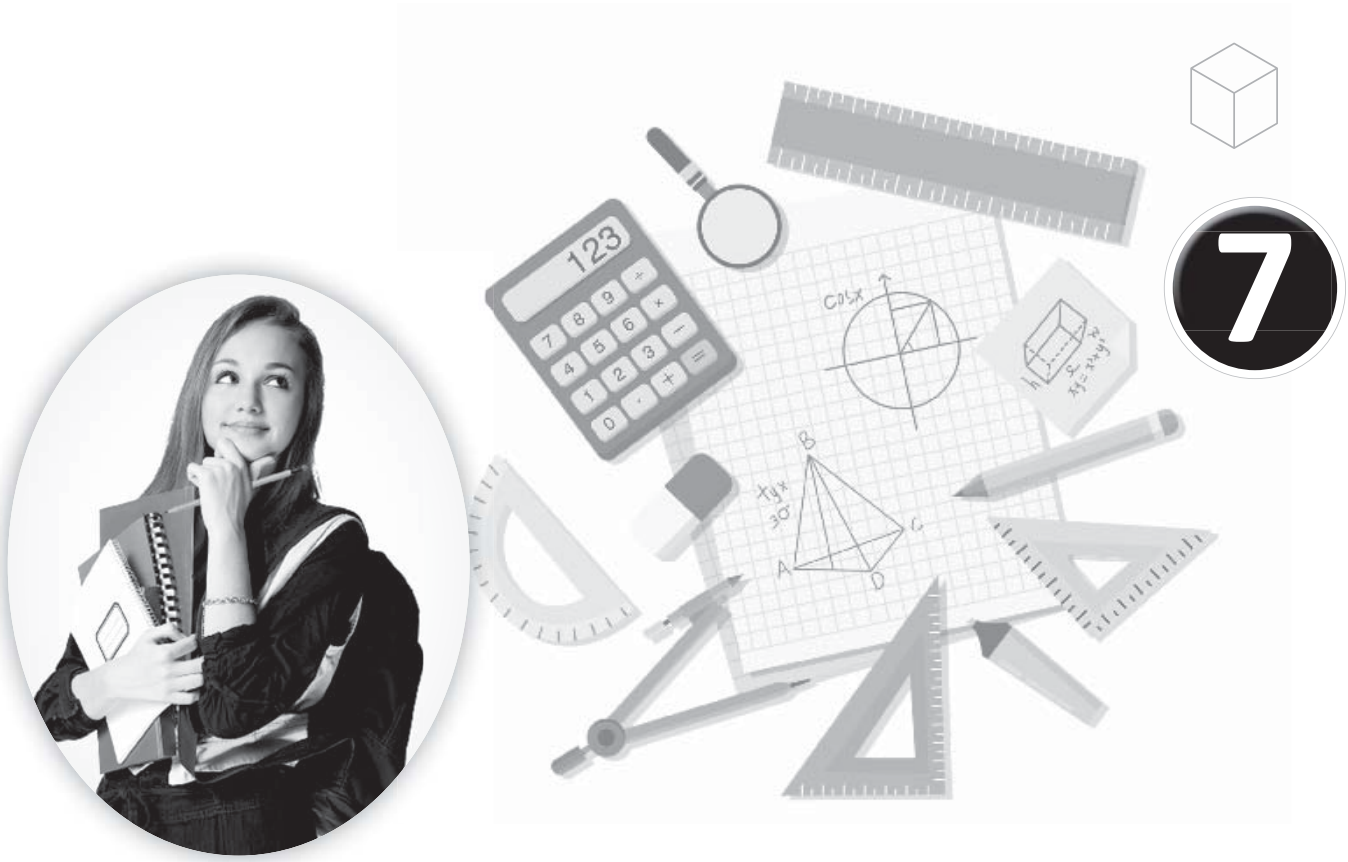
Best Way's book of

MATHEMATICS

ANSWER KEY



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1 Integer

Exercise 1.1

1. (a) $10 \times (-4)$

$-(10 \times 4)$

$= -40$

(b) $(-5) \times (-9)$

$= 45$

(c) $(-11) \times (+5)$

$= -(11 \times 5)$

$= -55$

(d) $(+22) \times (-90)$

$-(22 \times 90)$

-1980

(e) 12×3

$= 36$

(f) $(-21) \times (-30)$

$= 630$

(g) $(-225) \times 0$

$-(225 \times 0)$

$= 0$

(h) $(-8) \times (-9)$

$= 72$

2. (a) $(-30) \div 5$

$= (30 \div 5)$

$= -6$

(b) $-176 \div 8$

$-(176 \div 8)$

$= 22$

(c) $6 \div 8(-8) \div (3 - 1)$

$0.75\ (-8) \div 2$

$= -6 \div 2$

$= -3$

(d) $(-8) \div (-2)$

$(8 \div 2)$

$= 4$

(e) $-12 \div 1$

$-(12 \div 1)$

$= -12$

(f) $-65 \div 13$

$-(65 \div 13)$

$= -5$

(g) $0 \div (-29)$

$-(0 \div 29)$

$= 0$

3. (a) $\_\_\_\_\_ \div 4 = 4$

$\_\_\_\_\_ = 4 \times 4$

$\_\_\_\_\_ = 16$

(b) $24 \div \_\_\_\_\_ = -6$

$\_\_\_\_\_ = 6 \times 24$

$\_\_\_\_\_ = -144$

(c) $-28 \div \_\_\_\_\_ = -4$

$\_\_\_\_\_ = -28 \div -4$

$\_\_\_\_\_ = -7$

(d) $(-2) \times (-8) \times \_\_\_\_\_ = -32$

$16 \times \_\_\_\_\_ = -32$

$\_\_\_\_\_ = \frac{-32}{16}$

$\_\_\_\_\_ = -2$

(e) $-25 \times \_\_\_\_\_ = -25$

$\_\_\_\_\_ = \frac{-25}{-25}$

$= 1$

(f) $-(42) \times 12 = \_\_\_\_\_$

$-(42 \times 12) = \_\_\_\_\_$

$-\ 504$

(g) $\_\_\_\_\_x - 100 = 1500$

$\_\_\_\_\_ = 1500 \div (-100)$

$\_\_\_\_\_ = -(1500 \div 100) = -15$

(h) $-(-5) \times (-5) = \_\_\_\_\_$

$-(25) = \_\_\_\_\_$

$\_\_\_\_\_ = -25$

(i) $-6-1\times12=$ _____

$-1-(1\times12)=$ _____

$-(-12)=$ _____

_____ $=12$

(j) $0\div25=$ 0

4. (a) True, $25+-(25)$

$=25-25=0$

(b) $23\times(-13)=13\times(-23$

$-(23\times13)=-(13\times23)$

$-299=-299$: True

(c) True, as the sum of 2–ve int. is always a negative int., and a–ve int. is always smaller than 0.

(d) False, as when divisor & dividend have different sign then, the quotient is always negative.

(e) Yes, as when even number of –ve int. are multiplied then the product is always + ve

5. (a) $6\times-2=$ Additive inverse of 12 (12 – 12 = 0 –12 is the additive inverse of 12)

$-(6\times2)=-12$

$-12=-12$

(b) Product of 11 and –3

$(11\times3)=-(11\times3)$

$=-33$

Absolute value is always the

Hence, Absolute valure –33 is 33.

Exercise 1.2

1. (a) $6+8+4+5$

$(6+4)+(8+5)$

$10+13=23$

(b) $78+36+64+24$

$(78+24)+(36+64)$

$102+100$

$=202$

(c) $43+23+77$

$43+(23+77)$

$43+100$

$=143$

(d) $58+26+74+42$

$(58+42)+(26+74)$

$100+100$

$=200$

2. (a) $5+3=$ 3 $+5$ (Commulative Property)

(b) $(-7)+$ 5 $=5+(-7)$ (Commulative Property)

(c) $(-4)+(-7)=$ –7 $+(-4)$ (Commulative Property)

(d) $[(-5)+(-4)]=$ (–5) $+(-4)$ (Commulative Property)

(e) $p+q=$ q $+p$ (Commulative Property)

(f) $n+$ m $=m+n$ (Commulative Property)

3. (a) $(-18+5)+6=-18+(6+5)$

$-13+6=-18+11$

$-7 \quad = \quad -7$

(b) $19+(-3+6)=[19+(-3)]+6$

$19+3=16+6$

$22 \quad = \quad 22$

(c) $11+4+(-9)=11+[4+(-9)]$

$15-9=11+(4-9)$

$6=11+(-5)$

$6=11-5$

$6=6$

4. (a) $(18-6)+2=18-(6+2)$

$12+2=18-(8)$

$14=18-8$

$14\neq10$

(Subtraction is not associtative for int.)

(b) $(76-6)-18=76-(6-18)$

$70-18=76-(-1)$

$52=76+12$

$52\neq88$

(Subtraction is not associative for intergers)

(c) $(742+58)+10=742+(58-10)$

$800+10=742+48$

$810\neq790$

(d) $(437 - 32) + 42 = 437 (32 + 42)$

$435 + 42 = 437 - (74)$

$477 = 437 - 74$

$477 \neq 3636$

(Subtraction is not associtative for int.)

(e) $7 - 4 = 4 - 7$

$3 \neq -3$

Subtraction is not commulative for integers.

(f) $346 - 200 = 200 - 346$

$146 = -146$

(Subtraction is not associtative for int.)

Exercise 1.3

1. (a) $36 + \_\_\_\_\_ = 25$

$\_\_\_\_\_ = 25 + (-36)$

$\_\_\_\_\_ = 25 - 36$

$\_\_\_\_\_ = -11$

(b) $3 + (\underline{-13}) = -13 + 3$

(Commulative property)

(c) $-3 \times 5 = 5 \times \underline{-3}$

(Commulative property of Multiplication)

(d) $-4 \times \underline{0} = 0$

(Multiplication by 0).

(e) $15 \div \underline{-1} = -15$

(Division by –1 is always the additive inverse of the invt)

(f) $-9 \times \_\_\_\_\_ = -9$

(Multiplication by1)

(g) $\underline{-2} + 2 = 0$

(Additive identity)

(h) $13 + (-13) = \underline{0}$

(Additive inverse)

(i) $\underline{0} \div 15 = 0$

(Division of 0 by any non –0int. is always 0).

(j) $12 \div \underline{-1} = 12$

(Division by –1 is always the additive inverse of the invt)

2. (a) $(8 \times 12) \times 6 = 8 \times (12 \times 6)$

$96 \times 6 = 8 \times 96$

$576 = 576$

(b) $[(-6) \times (-11)] \times 2 = (-6) \times [(-11 \times 2)]$

$[-6x - 11] \times 2 = -6 \times (-22)$

$= 66 \times 2 = -6 \times -22$

$132 = 132$

(c) $[6 \times (-73)] \times 5 = 6 \times [(-73) \times 5]$

$[6 \times -73] \times 5 = 6 \times [-73 \times 5]$

$-438 \times 5 = 6 \times 365$

$-2190 = -2190$

3. (a) $6 + (-5) = -5 + 6$

$6 - 5 = -5 + 6$

$1 = 1$ (Commulative property of addition)

(b) $26 \times [2 + (-1)] = 26 \times 2 + 36 \text{ x } (-1)$

$26 \times [2 - 1] = 52 + 26 \ -1$

$26 \times 1 = 52 - 26$

$26 = 26$ (Distributive property)

(c) $14 \times 3 = 3 \times 14$

$42 = 42$ [Commulative property]

(d) $6 + [5 + (-4)] = [6 + (-4)] + 5$

$6 + [5 - 4] = [6 - 4] + 5$

$6 + 1 = 2 + 5$

$7 = 7$ (Associative Property of multiplication)

4. (a) $17 (8 + 3) = 17 \times 8 + 17 \times 2$

$= 17 \times 8 + 17 \times 2$

$= 136 + 34$

$170 = 170$

(b) $22 (36 + 15) = 22 \times 36 + 22 \times 15$

$22 (51) = 792 + 330$

$1122 = 1122$

(c) $17 \times 76 + 17 \times 24 = 17 (76 + 24)$

$1292 + 408 = 17 (100$

$1700 = 1700$

(d) $(-5) \times 30 + (-5) \times 20 = (-5)(30 + 20)$

$-5 \times 30 + -5 \times 20 = (-5)(50)$

$-150 + (-100) = -250$

$-150 - 100 = -250$

$-250 = -250$

(e) $19 \times (-12) + 2 \times (-12) = -12(19 + 2)$

$19 \times -12 + 2 \times -12 = -12(21)$

$-228 + (-24) -252$

$-252 = -252$

(f) $20 \times 12 + 20 \times (-4) = 20[12 + (-4)]$

$240 + 20 \times -4 = 20[12 - 4]$

$240 + (-80) = 20[8]$

$240 - 80 = 160$

$160 = 160$

(g) $18 \times 10 + 18 \times (-20) = 18 \times [10 + (-20)]$

$180 + 18 \times -20 = 18 \times [10 - 20]$

$180 + (-360) = 18 \times [-10]$

$180 - 360 = -180$

$-180 = -180$

5. (a) True

(b) True

(c) False

(d) False

(e) True

Exercise 1.4

1. Sum of two integers = 532

One integer = –293

Other integer = Sum of the integers – One integer

= 532 – (–293)

= 532 + 293

= 825

Hence, the second int is 816.

2. Product of 2 number = –250

One of the number = –25

Other number = Product of 2 Numbers ÷ One of the number

= –250 ÷ (–25)

= 10

Hence, the other number is 10.

3. Midday temperature = 220°c

Temperature 2 hour later = 20°c warmer = Rise in Temperature = +20°c

Temperature 2 hour later Midday temperature + Rise in temperature

= 220°c + 20°c

= 240°c

Answer: Two hours later temperature was 240°c

4. Profit of ₹425 on Monday = +₹425

Loss of ₹169 on Tuesday = –₹169

Profit of ₹285 on Wednesday = +₹285

Net Profit at the end of 3 days = Profit on Monday + Loss on Tuesday + Profit on Wednesday

= ₹425 + (–₹169) + ₹285

= ₹(425 + (–169) + 285

= ₹ (425 – 169 + 285)

= ₹(541)

= ₹541

Therefore At, the end net of profit of 3 days is of ₹541

5. 20 feet decended = –20

10 feet rise = +10

18 feet decended = –18

His depth in the water = –20 + (+10) + (–18)

– 20 + 10 –18

= –10 –18 = 28

= 28 feet desended

Answer: The diver is 28 feet desended

6. Rahul divided –350 and –7

$= -350 \div -7$

$= \frac{-350}{-7}$

= 50 Hence, the quotient id 50.

7. Number of marbles with Rohit: 8

Number of marbles with Amit : more marbles than twice of the number of Rohit

$= 5 + (2 \times 8)$

$= 5 + 16 = 21$

Therefore Amit have 21 marbles

8. Amount of which Rahul purchsed the grocery: ₹350

Number of Friends that will help Rohit to pay the debt: 10

Amount each friend will pay :

$$\frac{\text{Total number of purchased grocery}}{\text{Number of friends}}$$

$= ₹\frac{350}{7} = ₹35$

Answer: Each friend will pay ₹35.

9. Temperature in Shara desert: 136°f

Teperature in Gobi desert: –60°f

Different in there temperature: (136 – (–60°))f

$= (136 + 60°) = 196°f$

10. Speed of water submarine = 20m per minute

Distance Submarine Crossed after 45 minutes: Distance = Speed × Time

= Distance = (20 × 45)m

Distance = 900m

Answer: After 45 minutes Submarine will cover a distance of 900m.

11. Distance covered by 1kg rock in 57 minutes = –6660 meters

Distance covered by 1kg rock in 1 minutes = $\frac{-6600}{57}$meters

Answer: Rock will fall –115.78 metres = –115.78 meters in one minute.

12. Lowest point of the Japanese Trech in the pacific Ocean: –10372m

Lowest point of the Pverto Rico Trench in the Atlantic ocena: 1172m higher than Japanes trench

=(–10372 + 1172)m

= –9200m

Answer: Lowest point of the Pverto Rico Trench in the Atlantic ocena is –9200m.

13. Amount paid by stall keeper to shot the target: ₹15

Amount paid to Stall keepter with each missed target: ₹5

Number of times Ramesh make a shot: 25

Total Amount paid by Stall keeper to Rames: Number of times Ramesh make a Shot × Amount paid by Stall Keeper to shot each target

$= ₹(15 \times 25) = ₹375$

Number of times Ramesh missed the target: 5

Money paid by Ramesh to stall keeper: Number of times Rameh missed the target × Amount to be paid to stall keeper for each missed target: ₹(5 × 5)

= ₹25

Total money made by Ramesh = Money paid by Shopkeeper to Ramesh – Money paid to Shopkeeper by Ramesh

$= ₹(375 – 25) = ₹350$

Answer: Total money made by Rames is ₹375.

14. The temperature at 12 noon = 10°C above zero

The temperature is decreasing at 2°C per hour

8° C below zero = – 8°C

So, total fall in temperature from 10°C to 0°C and from 0°C to – 8°C = 18°C

Since the temperature falls 2°C in every one hour.

Therefore, to decrease 18°C, time taken = $\frac{18}{2}$ = 9 hours

The present time is 12 noon so, the time when the temperature is – 8°C = 12 noon + 9 hours

So, The time at which the temperature will be – 8°C = 9 PM

Thus, at 9 pm temperature would be 8°C below zero.

Later,

The temperature at 12 noon = 10°C

The temperature decreases by 2°C every hour

The temperature decrease in 12 hours = – 2°C × 12 = – 24°C

At midnight, the temperature will be = 10°C + (–24°C) = –14 °C

Therefore, the temperature at mid night will be 14°C below 0.

So, at 12 midnight the temperature will be – 14°C

Review Exercise

1. (i) 45 + (–55) –(–27)

45 + (–55) + 27

45 + 27 + (–55)

72 – 55

= 17

Answer: (a) 17

(ii) (–7) + (–5)

= –(7 + 5)

= –(12)

= –12

Answer: (b) –12

(iii) Additive of –6

= –6 + 6 = 0

(b) 6

(iv) –120 + 78 + 41

–120 + (78 + 41)

–120 + 119

Answer: (c) –1

(v) Whenever a number get multiplied by –1, the product is always the additive inverse of the number

a × –1 = –a

as s + (–a)

= a – a = 0

Answer: (a) –a

2. (d) (–10) × 2 is the odd one out as it is only in multi+plication where as, else terms are in division.

3. –80 ÷ 5 + (–3) = –80 ÷ 5 – 3 = –16 – 3 = 19

Answer: (a) –19

4. 6 ÷ (–1) = –6 (Division by –1 is always the inverse of the number

–6 does not lies between 0 and 6

Answer: (a) 0 and 6

5. –30 ÷ 6 = –5, it is not Same as 6 ÷ (–30) as 6 ÷ (–30) = –0.2

–5 ≠ –0.2

Answer: (c) 6 ÷ (–30)

6. Initial depth: –250

Number of times Submarine dives to its initial depth: 6 times

Depth at which Submarine dives: Initial depth × Number of time Submarine dives to initial depth

= –(250m × 6)m

= –1500m

Answer: (a) –1500m

7. $0 \div -6 = \frac{0}{-6}$

Answer: (b) 0 ÷ (–6)

8. (i) –5 × 6 = 30

(ii) –60 ÷ (–2) = 30

(iii) –30 × –1 = –30

(iv) –8 × 3 × –6 = –24 –6 = –30

Answer: (c) (i), (iii) and (iv)

9. (a) (–3) × (–4) × 5 × (–8) has a different value as only its product is –480 whereas, other number products are +480.

10. –56 × (–99) + 56

= 5600

Answer: (c) 5600

11. (80 ÷ 5) × (–3) = 16 × –3 =

Answer: (a) –48

12. (a) $-6 = -2 + (-4)$

(b) $5 = -3 - (-8)$

(c) $-3 = -4 + 1$

(d) $-7 = -9 + 2$

13. (a) $(-4) + (-11) = -11 + (-4)$ (Commulative property)

(b) $-13 + \underline{13} = 0$ (Additive inverse)

(c) $7 + [17 + (4)]$

$= [7 + 17] + 4$ (Associative property)

14. (a) $8 \times 6 \times 5$

$= 8 \times (\times 5) = 8 \times 30 = 240$

(b) $-3 \times (-25)$

$= 75$

(c) $333 \times (-1)$

$= -333$

(Multiplication by -1 is always the additive inverse of the number)

(d) $(-21) \times 0 \times 24$

$= 0$ (Multiplication of any number by 0 is always 0)

(e) $-3 \times 4 \times (-5)$

$-3 \times (4 \times -5)$

$-3x -(4 \times 5)$

$-3x -20$

$= 60$

(f) $(-3) \times (-2) \times (-10)x (-11)$

$(-3) \times (-2) \times (-11) \times (-10)$

$(6 \times -11) \times -10$

-66×-10

$= 660$

15. (a) $88 \div 1$

$= 88$

(Division by 1 is always the number itself)

(b) $-98 \div 14$

$= -(98 \div 14)$

$= -7$

(c) $0 \div 50 = 0$

Division of 0 by any non –zero int. is always 0.

(d) $135 \div 135 = 1$

(Division of any number by the number itself is always 1)

(e) $(-5) \div (-5) = 1$

16. (a) $27 \times [-6 + (-8)] = [27 \times (-6)] + [+27 \times (-8)]$

$27 \times [-6 -8] = -[27 \times 6] + -[27 \times 8]$

$27 \times -14 = -162 + (-216)$

$-378 = -(162 + 216)$

$-378 = -378$

(b) $7 \times (-5 \times 4) = [7 \times (-5)] \times 4$

$7 \times -(5 \times 4) = -[7 \times 5] \times 4$

$7 \times -20 = -35 \times 4$

$-140 = -140$

17. (a) 19×12 is an integer [Closure property]

(b) $32 \times 17 = 17 \times 32$ [Commulative property]

(c) $55 \times 1 = 55$ [Multiplication by 1]

(d) $(25 \times 36) \times 72 = 25 \times (36 \times 72)$

[Associative property]

(e) $(83 \times 154) - (83 \times 54) = 83 \times 100$

[Distributive property]

18. Temperature on Sunday: 30°c

Temperature on Monday: Rises by + 10°c = 36°c + 10°c = 46°c

Temperature on Tuesday: Dropped by –2°c = 46°c – 2°c = 44°c

Temperature on Monday & Tuesday is 46°c and 44°c respectively.

19. Amount Rahul deposited in his bank account : ₹5000

Amount Rahul deposited in his bank next day: ₹2000

Amount Rahul withdraw in his bank account next week: ₹1500

Balance is Rahul's account: Initial deposit + Money deposited next day – Money withdraw next week

= ₹5000 + 2000 – 1500)

= ₹(7000 – 1500) = ₹(5500)

= ₹5500

Answer: Rahul ahs ₹500 in his bank account.

20. Number of question: 20

Number of marks awarded for every correct answer: +2 marks

Number of marks deducted for every wrong answer: –1marks

Number of given for every unanswered question: 0marks

(i) Number of correct answer: 16

Score for correct answer: 16 × 2

= 32

Number of incorrect answer: 3

Score for incorrect answer: 3 × –1

= –3

Aryan's total score = Score for correct answer + Score for in correct answers

= 32 + (–3) = 29

Aryan's total score is 29.

(ii) Number of correct answer: 18

Score for correct answer: 18 × 2

= 36

Number of incorrect answers: 4

Score for incorrect answer: 4 × –1

= –4

Rashmi's total score: Score for correct answers + Score for incorrect answers

= 36 + (–4)

= 36 – 4 = 32

Answer: Rashmi's total score is 35.

21. Speed of mine shaft: 7m/min

Position after 40 minutes: Speed × Time

= (7 × 40)m

= 280m

Initial position of mine Shaft: 8m above ground

Position of mine Shaft after 1 hour = Speed × Time

7 × 1 hour [1 hour = 60 minutes]

= (7 × 60)m

If the initial position = 420m

Of mine Shaft is 8m above the ground, then the position of mineshaft will be 420m – 8m = 412m in the ground

Hence, the position of mineshaft is 412m.

22. Profit on selling 1book: ₹2

Loss on selling per pen: 50 paise

Loss in a particular month: ₹10

Numbers of books sold: 40

Profit on books: Number of book sold × Profit on sale of 1 book

= ₹(40 × 2)

= ₹80

Total loss: Total loss on slae on pens – Total profit on sale of books

₹10 = Loss on 1 pen × Number of pens sold –₹180

₹10 = 50p × Number of pens sold –₹80

₹(10 + 80) = 50 p × Number of pens sold

₹90 = 50p × Number of pens sold

$\frac{₹90}{50p}$ = Number of pens sold

$1p = \frac{₹1}{100} = \frac{₹90}{0.50} = 180$

Answer: 180 pens were sold in the peroid

23. (1) (15, –3) 15 ÷ (–3) = –5

(2) (10, –2) = 10 ÷ (–2) = –5

(3) (25 ÷ 5) = 25 ÷ (–5) = –5

(4) (30, –6) = 30 ÷ (–6) = –5

Check Your Progress

1. Positive

2. Positive

3. Negative

4. Negative

5. 0

6. 0

7. –8 km

8. Right, Left

9. 0 + 1 = 1

10. 0 – 1 = –1

11. Positive

12. 0.

2 Fractions and Decimals

Exercise 2.1

1. (a) $\frac{7}{8} \times \frac{4}{3} = \frac{7 \times 4}{8 \times 3} = \frac{\cancel{28}}{\cancel{24}} \frac{7}{6} = \frac{7}{6}$

(b) $\frac{11}{13} \times \frac{13}{22} = \frac{11 \times 13}{13 \times 22} = \frac{143}{286} = \frac{1}{2}$

(c) $\frac{28}{45} \times \frac{15}{26} = \frac{14 \times 1}{3 \times 13} = \frac{14 \times 1}{3 \times 13} = \frac{14}{39}$

(d) $\frac{16}{21} \times \frac{7}{64} = 1\ 3\ \frac{\cancel{16} \times 7}{\cancel{21} \times \cancel{64}\ 4} = \frac{1}{3 \times 4} = \frac{1}{12}$

(e) $\frac{15}{22} \times \frac{12}{60}\ 1\ 11\ \frac{\cancel{15} \times 12\cancel{6}\ 3}{\cancel{22} \times \cancel{60}\ \cancel{4}\ 2} = \frac{3}{11 \times 2} = \frac{3}{22}$

(f) $\frac{81}{75} \times \frac{25}{36} = \frac{3}{1}\ \frac{\cancel{9}\ \cancel{81} \times 25\ 1}{\cancel{3}\ \cancel{75} \times \cancel{36}\ 4} = \frac{3 \times 1}{1 \times 4} = \frac{3}{4}$

2. (a) $5 \times 7\frac{1}{10} = 1\ \cancel{5} \times \frac{\cancel{71}}{2\ \cancel{10}} = \frac{71}{2} = 35\frac{1}{2}$

(b) $\frac{3}{7} \times 14\frac{13}{10} = \frac{3}{7} \times \frac{153}{\cancel{10}} = \frac{3 \times 153}{7 \times 10} = \frac{459}{70}$

(c) $5 \times 7\frac{3}{5} = 1\ \cancel{5} \times \frac{38}{1\ \cancel{5}} = 38$

(d) $\frac{1}{4} \times 6\frac{22}{17} = \frac{1}{4} \times \frac{\cancel{124}}{17}\ 31 = \frac{31}{17} = 1\frac{18}{17}$

(e) $5\frac{1}{3} \times 8\frac{1}{2} = \frac{\cancel{16}}{3}\ 8 \times \frac{17}{\cancel{2}\ 1} = \frac{136}{3} = 45\frac{1}{3}$

(f) $7\frac{1}{3} \times 6\frac{1}{3} = 11\frac{\cancel{22}}{3} \times \frac{25}{\cancel{4}\ 2} = \frac{275}{6} = 45\frac{5}{6}$

(g) $15 \times 10\frac{3}{2} = \frac{15}{1} \times \frac{23}{2} = \frac{15 \times 23}{1 \times 2} = \frac{345}{2}$

(h) $\frac{3}{2} \times 8\frac{1}{2} = \frac{3}{2} \times \frac{17}{2} = \frac{51}{4} = 12\frac{3}{4}$

(i) $6\frac{3}{2} \times 4\frac{1}{2} = \frac{13}{2} \times \frac{9}{2} = \frac{117}{4} = 29\frac{1}{4}$

3. Total Number of students: 50

(a) Number of Students liked to play football = $\frac{1}{5}$ of total number of students = $\frac{1}{5} \times 50^{10}$ = 10 students

(b) Number of student like to play basketball = Total – [Number of student liked playing football + Number of student liked playing cricket]

= (50 – [10 + 30]) students

= (50 – 40) students = 10 students

(c) Number of students liked to play cricket = $\frac{3}{5}$ of total number of students

= $\frac{3}{5} \times \cancel{50}^{10}$ = 30 students

4. **(a)** (i) $\frac{1}{\cancel{4}} \times \cancel{20}^{5} = 5$

(ii) $\frac{1}{\cancel{4}} \times \cancel{32}^{8} = 8$

(iii) $\frac{1}{\cancel{4}} \times \cancel{48}^{12} = 12$

(b) (i) $\frac{4}{\cancel{5}} \times \cancel{35}^{7} = 4 \times 7 = 28$

(ii) $\frac{4}{\cancel{5}} \times \cancel{60}^{12} = 4 \times 12 = 48$

(iii) $\frac{4}{\cancel{5}} \times \cancel{175}^{35} = 140$

5. Part of book read in 1 hour = $\frac{1}{3}$

Part of book read in $4\frac{1}{5}$ hours = $4\frac{1}{5} \times \frac{1}{3}$

Answer: $\frac{2}{5}$ part of the book will part = $\frac{\cancel{21}}{5} \times \frac{1}{\cancel{3}1} = \frac{7 \times 1}{5 \times 1} = \frac{7}{5} = 1\frac{2}{5}$

Challenge

1. $1\ \frac{2}{\cancel{3}} \times 1\ \frac{\cancel{3}}{\cancel{5}}1 \times \frac{\cancel{20}}{1}4 = \frac{2 \times 1 \times 4}{1 \times 1 \times 1} = \frac{8}{1} = 8$

2. $1\ \frac{2}{\cancel{3}} \times 1\ \frac{\cancel{3}}{\cancel{5}}1 \times \frac{\cancel{28}}{1}7 = \frac{2 \times 1 \times 7}{1 \times 1 \times 1} = \frac{14}{1} = 14$

3. $1\ \frac{2}{\cancel{3}} \times 1\ \frac{\cancel{3}}{\cancel{4}}1 \times \frac{\cancel{48}}{1}12 = \frac{2 \times 1 \times 12}{1 \times 1 \times 1} = \frac{24}{1} = 24$

4. $1\ \frac{2}{\cancel{3}} \times 1\ \frac{\cancel{3}}{\cancel{4}}1 \times \frac{\cancel{80}}{1}20 = \frac{2 \times 1 \times 20}{1 \times 1 \times 1} = \frac{40}{1} = 40$

Exercise 2.2

1. (a) $\frac{3}{7} \times \frac{7}{3} = 1$

Reciprocal : $\frac{7}{3}$

(b) $\frac{13}{3} \times \frac{9}{13} = 1$

Reciprocal $\frac{9}{13}$

(c) $\frac{17}{25} \times \frac{25}{17} = 1$

Reciprocal = $\frac{25}{17}$

(d) $18 = \frac{18}{1}$

$\frac{18}{1} \times \frac{1}{18} = 1$

Reciprocal = $\frac{1}{18}$

2. (a) $4\frac{2}{5} \div \frac{2}{5}$

$1\ \cancel{22}^{11} \times {}_{1}\cancel{5}^{1} = \frac{11 \times 1}{1 \times 1} = \frac{11}{1} = 11$

(b) $7 \div \frac{1}{5}$

$\frac{7}{1} \times \frac{5}{1} = \frac{7 \times 5}{7 \times 1} = \frac{35}{1} = 35$

(c) $5 \div \frac{5}{7} = \cancel{5}^{1} \times \frac{7}{\cancel{5}1}$

$= \frac{1 \times 7}{1 \times 1} = \frac{7}{1} = 7$

(d) $2 \div \frac{10}{13} = \cancel{2}^{1} \times \frac{13}{\cancel{10}5} = \frac{1 \times 13}{1 \times 5} = \frac{13}{5} = 2\frac{3}{5}$

(e) $\frac{5}{13} \div \frac{1}{5} = \frac{5}{13} \times \frac{5}{1} = \frac{5 \times 5}{13 \times 1} = \frac{25}{13} = 1\frac{12}{13}$

(f) $\frac{1}{2} \div \frac{4}{7} = \frac{1}{2} \times \frac{7}{4} = \frac{1 \times 7}{2 \times 4} = \frac{7}{8}$

3. (a) $12 \div 3\ \frac{\cancel{12}^{4}}{1} \times \frac{1}{\cancel{3}1} = 4, \frac{\cancel{6}^{3}}{1} \times \frac{1}{\cancel{2}1} = 3$

(b) $10 \div \frac{1}{2} = 10 \times 2 = 20, 5 \times 4 = 20$

(c) $5 \div \frac{1}{5} = 5 \times 5 = 25, 5 \times 7 = 35$

(d) $7 \div \frac{7}{5} = \cancel{7}^{1} \times \frac{5}{\cancel{7}1} = \frac{1 \times 5}{1 \times 1} = 5$

(e) $\frac{1}{5} \div \frac{1}{6} = \frac{1}{5} \times \frac{6}{1} = \frac{1 \times 6}{5 \times 1} = \frac{6}{5}, \frac{1}{5} \times \frac{6}{1}$

$= \frac{1 \times 6}{5 \times 1} = \frac{6}{5} = 1\frac{1}{5}$

(f) $12 \div \frac{1}{5} = 12 \times 4 = 48, 12 \times 4 = 48$

4. (a) $\frac{2}{3} \div \frac{1}{5} = \frac{2}{3} \times \frac{5}{1} = \frac{10}{3} = 3\frac{1}{3}$

(b) $\frac{2}{3} \div \frac{35}{10} = \frac{3}{\cancel{5}1} \times \frac{\cancel{10}^{2}}{35} = \frac{\cancel{30}}{\cancel{165}} = \frac{6}{35}$

(c) $\frac{15}{8} \div \frac{5}{9} = \frac{\cancel{15}^{3}}{8} \times \frac{9}{\cancel{5}1} = \frac{3 \times 9}{8 \times 1} = \frac{27}{8}$

(d) $\frac{2}{7} \div \frac{1}{11} = \frac{2}{7} \times \frac{11}{1} = \frac{22}{7} = 3\frac{1}{7}$

(e) $\frac{9}{11} \div \frac{5}{11} = \frac{9}{\cancel{11}1} \times \frac{\cancel{11}^{1}}{5} = \frac{9}{5}$

(f) $\frac{5}{7} \div \frac{2}{7}\ \frac{5}{\cancel{7}1} \times \frac{\cancel{7}^{1}}{2} = \frac{5}{2}$

(g) $\frac{7}{9} \div \frac{5}{9} = \frac{7}{\cancel{9}1} \times \frac{\cancel{9}^{1}}{5} = \frac{7}{5}$

(h) $\frac{7}{8} \div \frac{2}{7} = \frac{7}{8} \times \frac{7}{2} = \frac{49}{16}$

(i) $\frac{4}{7} \div \frac{8}{11} = \frac{\cancel{4}^{1}}{7} \times \frac{11}{\cancel{8}2} = \frac{11}{14}$

(j) $\frac{12}{15} \div \frac{3}{13} = \frac{\cancel{12}^{4}}{15} \times \frac{13}{\cancel{3}1} = \frac{52}{15}$

5. (a) $\frac{5}{48}, \frac{5}{24}, \frac{5}{12}, \frac{5}{6}, \frac{5}{3}, \frac{5}{1}$ (Division by $\frac{1}{2}$)

(b) $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \frac{1}{64}, \frac{1}{128}$ (Division by 2)

(c) $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, 1, 1\frac{1}{4}, 1\frac{1}{2}, 1\frac{3}{4}$ (Addition of $\frac{1}{4}$)

(d) $\frac{1}{2}, 1, 1\frac{1}{2}, 2, 2\frac{1}{2}, 3, 3\frac{1}{2}$ (Addition of $\frac{1}{2}$)

6. (a) $\frac{2}{3} \div \frac{2}{5} = \frac{\cancel{2}^{1}}{3} \times \frac{5}{\cancel{2}1} = \frac{1 \times 5}{3 \times 1} = \frac{5}{3}$

(Numerator > Denominator 5 > 3 hence, it is greater than 1)

(b) $\frac{7}{9} \div \frac{2}{3} = \frac{7}{\cancel{9}3} \times \frac{\cancel{3}^{1}}{2} = \frac{7 \times 1}{3 \times 2} = \frac{7}{6}$

(Numerator > Denominator 7 > 6 hence, it is greater than 1)

(c) $\frac{8}{9} \div \frac{7}{11} = \frac{8}{9} \times \frac{11}{7} = \frac{8 \times 11}{9 \times 7} = \frac{88}{63}$

(Numerator > Denominator 88 > 63 hence, it is greater than 1)

(d) $\frac{2}{5} \div \frac{4}{5} = 1\ \frac{\cancel{2}^{1}}{\cancel{5}} \times 2\ \frac{\cancel{5}^{1}}{\cancel{4}} = \frac{1 \times 1}{1 \times 2} = \frac{1}{2}$

(Numerator < Denominator 1 < 2 hence, it is less than 1)

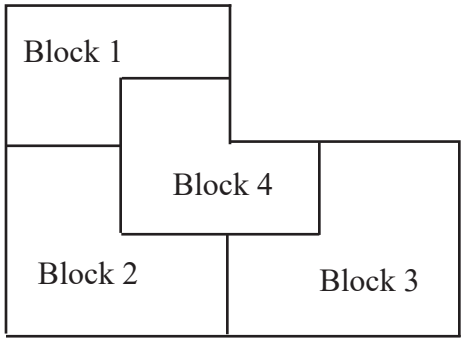
(e) $\frac{4}{3} \div \frac{1}{4} = \frac{4}{3} \times \frac{4}{1} = \frac{4 \times 4}{3 \times 1} = \frac{16}{3}$

(Numerator > Denominator 16 > 3 hence, it is greater than 0)

(f) $\frac{1}{7} \div \frac{1}{5} = \frac{1}{7} \times \frac{5}{1} = \frac{5}{7}$

(Numerator < Denominator 5 < 7 hence, it is less than 1)

Puzzle



Exercise 2.3

1. Length of canal to be dugged: 480m

Part of canal dugged by workers: $\frac{3}{4}$ part of canal

Length of canal left dugging: Length of cart – Part of canal dugged by workers

= 480m – $\frac{3}{4}$ of 480m = ($\frac{3}{\cancel{4}} \times \cancel{480}$ 120)m

= (480 – 360)m

= 120m

120m of Canal is left undugged.

2. Total weight of fruits: 96kg

Weight of mangoes: $\frac{1}{4}$ of 96kg = $\frac{1}{4} \times$ 96kg = 24kg

Weight of Oranges: Total weight of fruit – (Weight of Apples + Weight of Mangoes)

= 96kg – (24kg + 16kg)

= 96kg – 40kg = 56kg

Answer: Weight of Oranges in 52 kg

3. Total number of students: 48

Number of student watch a perticular Tv programme regularly = $\frac{1}{4}$ of total number of student

= $\frac{1}{4}$ of 48 = $\frac{3}{\cancel{4}} \times \cancel{48}$ 12

= 12 students

Number of student that do not watch the particular Tv Programme regularly

= Total number of student – (Number of student who watch regularly)

= (48 – 12) students = 36 students

Therefore, 36 students do not watch the T.v programme regularly.

4. Let the fraction be x

$x \times [4\frac{2}{3} + 7\frac{1}{3}] = 3$

$x \times [\frac{14}{3} + \frac{22}{3}] = 3$

$x \times [\frac{14 + 22}{3}] = 3 = X \times [\frac{3}{3}] = 3$

$x = \cancel{3}1 \times \frac{\cancel{3}}{\cancel{36}} \cancel{12}4$

$x = \frac{1}{4}$

Hence, the fraction is $\frac{1}{4}$.

5. Let the height of pole be x.

Height of building = $\frac{2}{7}$ of the height of pole

Height of building + Height of pole above the building = Height of pole

$11m + \frac{2}{7} \times x = x$

$11 = \frac{x}{1} - \frac{2}{7}x$

$11 = \frac{7x - 2x}{7} = \frac{5x}{7}$

$x = 11 \times \frac{7}{5}$

$x = \frac{77}{5}$

Hence, the height of pole is $\frac{77}{5}$ m

6. Let the fraction be x.

Different of $\frac{1}{3}$ & $\frac{1}{9} = \frac{1}{3} - \frac{1}{9} = \frac{3 - 1}{9} = \frac{2}{9}$

According to the question: Fraction: $\frac{2}{9} = \frac{2}{3}$

$x \div \frac{2}{9} = \frac{2}{3}$

$x = 1\frac{\cancel{2}1}{\cancel{3}} \times 1\frac{\cancel{9}3}{\cancel{2}} = \frac{3}{1}$

$\cancel{x} = \frac{3}{\cancel{1}}$ $x = \frac{2}{3} \times \frac{2}{9}$

Therfore, the fraction is $\frac{4}{27}$

7. Let the total number of flower be x.

Number of Roses = $\frac{13}{30}$ of flowers

Number of Tulip = $\frac{2}{5}$ of flowers

Number of Tulip = 7

Number of roses + Number of tulip + Number of lotus = Total number of flowers $\frac{13}{30}$ of x + $\frac{2}{5}$ of x + 11 = x

$\frac{3x}{30} + \frac{2}{5}x + \frac{7}{1} = x$

$\frac{3x + 12x + 210}{30} = x$

$25x + 210 = x \times 30$

$25x + 210 = 30x$

$210 = 3x - 25x$

$210 = 5x$

$x = \frac{210}{5} = 42$

Total number of flower = 42.

8. Total number of people in the wedding = 1800

Number of men = $\frac{11}{18}$ of the total people

$\frac{11}{\cancel{18}} \times \cancel{1800}^{100} = 1100$ men

Number of women = $\frac{11}{72}$ of total men

$= \frac{11}{\cancel{72}} \times \cancel{1800}^{25}$

$= 11 \times 25 = 275$ women

Number of children = Total people - (Number of men + Number of women)

$= 1800 - (1100 + 275)$

$= 1800 - (1375)$

$= 425$ children

Answer: There are 425 in the wedding.

9. Length of green ribbon = 12m 50cm

= 12.50

Length of Red ribbon = $\frac{3}{5}$ of green ribbon

$= \frac{3}{\cancel{5}} \times \cancel{12.50}\ 2.50\text{m} = 3 \times 2.50\text{m}$

= 7.50

Length of yellow ribon = $2\frac{1}{2}$ times of red ribbon ($2\frac{1}{2} = \frac{2 \times 2 + 1}{2} = \frac{4 + 1}{2} = \frac{5}{2}$)

$\frac{5}{\cancel{2}} \times \cancel{7.50}\ 3.75 = 18.75\text{m}$

Answer: Length of yellow ribbon is 18.75m

10. Number of Stamps with Sohan = 320 Stamps

Number of Stamps with Rohan = $3\frac{3}{4}$ times of number of stamps with Sohan

($3\frac{3}{4} = \frac{4 \times 2 + 3}{4} = \frac{12 + 3}{4} = \frac{15}{4}$)

$= \frac{15}{\cancel{4}} \times \cancel{320}\ 80 = 1200$

Therefore, Rohan has 1200 stamps.

11. Total amount of tickets that were sold by Mono & Bholu together = ₹3800

Ticket sold by Monu = $1\frac{3}{8}$ times that of Bholu

Let the tickets Sold by Bholy be x.

So, Ticket sold by Monu = $1\frac{3}{8}$ times of x

$= \frac{11}{8}$ of $x = \frac{11}{8}x$

$\frac{x}{1} + \frac{11}{8}x = 3800$

$\frac{8x + 11x}{8} = 3800 = \frac{19x}{8} = 3800$

$\frac{11x}{8} = \frac{11}{\cancel{8}} \times \cancel{1600}^{200} = 2200$

$x = \cancel{3800}^{200} \times \frac{8}{\cancel{19}}$

$x = 1600$

Answer: Tickets sold by Bholy were of ₹3800; whereas ticket sold of Monu were of ₹2200.

12. Weight of Guava = $3\frac{3}{4}$kg

Weight of Oranges = $5\frac{1}{2}$

Total Weight of fruits purchased by her = Weight of Gvava + Weight of Orange

$= (3\frac{3}{4} + 5\frac{1}{2})$kg

$= (\frac{15}{4} + \frac{11}{2})$kg $= \frac{15 + 22}{4}$kg $= \frac{37}{4}$kg $= 9$kg 250g

Rihan have be brought 9kg 250g of total fruits.

13. Number of Corona cases found in the month of April = 30, 000

Number of Corona Positive cases recovered = $\frac{9}{10} \times 30000$

= 27000

Number of deaths: Total number of patients – Number of patients recovered

= 30000 – 27000 = 3000

Therefore, 3000 students were recovered.

Puzzle

11.32	**4.4**	**12.0**	**10.8**	**6.6**	4^2
5.8	9.6	**11.4**	**7.2**	**8.0**	4^2
4.28	11.28	8.6	**4.8**	13.04	4^2
11.6	11.6	**4.2**	4.8	6.68	4^2
9.0	5.12	**5.8**	**14.4**	**7.68**	
4^2	4^2	4^2	4^2	4^2	4^2

Sum of all the numbers horizontally, vertically Diagnolly should be 42.

Exercise 2.4

1. (a) 0.5546 × 200

= 0.5546 × 2 × 100

= 1.1092 × 100

= 110.92

(b) 56.285 × 100

= 5628.5

(c) 9.8 × 10

= 98

(d) 8.49 × 100

849

(e) 2.84 × 4 × 10

11.36 × 10 = 113.6

(f) 22.168 × 30

22.168 × 10 × 3

= 66.504 × 10 = 665.04

(g) 18.168 × 300

18.168 × 3 × 100

54.504 × 100

= 5450.4

(h) 4.48 × 1000

= 4480

(i) 18.17 × 70

18.17 × 7 × 10

= 127.19 × 10 = 1271.9

(j) 20.1 × 120

= 20.01 × 12 × 10

= 240.012 × 10 = 2401.2

2. (a) 11.58 × 5.4

		1	1	. 5	8	
×				5	4	
		4	6	3	2	
+	5	7	9	0	×	
	6	2	5	3	2	

11.58 = 2 decimal places

5.4 = 1 decimal places

= 3 decimal palces

= 62.532

(b) 118.4 × 4.10

			1	1	8	4
×				4	1	0
				0	0	0
		1	1	8	4	×
+	4	7	3	6	×	×
	4	8	5	4	4	0

118.4 = 1 decimal place

4.10 = 2 decimal places

= 3 decimal places

= 485.440

(c) 9.45 × 4.2

				9	4	5
×				4	2	2
			1	8	9	0
		1	8	9	0	×
+	3	7	8	0	×	×
	3	9	8	7	9	0

9.45 = 2 decimal places

4.22 = 2 decimal places

= 4 decimals places

= 39.8790

(d) 12.64 × 2.103

				1	2	6	4
×				2	1	0	3
				3	7	9	2
			0	0	0	0	×
+		1	2	6	4	×	×
	2	5	2	8	×	×	×
	2	6	5	8	1	9	2

12.64 = 2 decimals places

2.103 = 2 decimals places

= 26.58192

(e) 5.48 × 4.72

				5	.	4	8
×				4	.	7	2
			1	0	9	6	
		3	8	3	6	×	
+	2	1	9	2	×	×	
	2	5	5	6	5	6	

5.48 = 2 decimal places

4.72 = 2 decimal places

= 25.5656

(f) 32.28 × 13.25

				3	2	2	8
×				1	3	2	5
			1	6	1	4	0
			6	4	5	6	×
+		9	6	8	4	×	×
	3	2	2	8	×	×	×
	4	2	7	7	1	0	0

32.28 = 2 decimal places

13.25 = 2 decimal places

= 4 decimal places

= 427.7100

(g) 3.208 × 1.005

				3	2	0	8
×				1	0	0	5
			1	6	0	4	0
			0	0	0	0	×
+		0	0	0	0	×	×
	3	2	0	8	×	×	×
	3	2	2	4	0	4	0

1.005 = 3 decimal places

3.208 = 3 decimals places

= 6 decimal places

= 3.224040

(h) 23.162 × 2.272

				2	3	1	6	2
×					2	2	7	2
				4	6	3	2	4
			1	6	3	2	4	×
+		4	6	3	2	4	×	×
	4	6	3	2	4	×	×	×
	5	2	6	2	4	0	6	4

23.162 = 3decimal places

2.272 = 3 decimal places

= 6 decimal places

= 52624.064

(i) 2.312 × 1.7 × 1.5

		2	.	3	1	2			3	9	3	0	4
×					1	7	×					1	5
	1	6	1	8	4			1	9	6	5	2	0
+	2	3	1	2	×		+	3	9	3	0	4	×
	3	9	3	0	4			5	8	9	5	6	0

2.312 = 3 decimal places
1.7 = 1 decimal place
1.5 = 1 decimal places
= 5 decimal places
= 5.89560

(j) 6.7 × 1.31 × 4.45

			6	7					8	7	7	7	
×		1	3	1	×					4	4	5	
			6	7				4	3	8	8	5	
	2	0	1	×			3	5	1	0	8	×	
+	6	7	×	×	+	3	5	1	0	8	×	×	
	8	7	7	7		3	9	0	5	7	6	5	

6.7 = 1 decimal place
1.31 = 2 decimal place
4.45 = 2 decimal places
= 39.05765

(k) 3.17 × 3.36 × 11.44

			3	1	7							
×			3	3	6							
		1	9	0	2							
		9	5	1	×							
+	9	5	1	×	×							
	10	6	5	1	2							

			1	0	6	5	1	2		
×						1	1	4	4	
				4	2	6	0	4	8	
			4	2	6	0	4	8	×	
+		1	0	6	5	1	2	×	×	
	1	0	6	5	1	2	×	×	×	
	1	2	1	8	4	9	7	2	8	

3.17 = 2 decimal places
3.36 = 2 decimal places
11.44 = 2 decimal places
= 121.849728

3. (a) 148.29 ÷ 10

$$\frac{148.29}{10} = 14.829$$

(b) 8.24 ÷ 100

$$\frac{8.24}{100} = 0.0824$$

(c) 0.526 ÷ 1000

$$0.000\,\frac{0.526}{1000} = 0.000526$$

(d) 412.47 ÷ 100

$$\frac{412.47}{100} = 4.1274$$

(e) 0.78 ÷ 10

$$\frac{0.78}{10} = 0.078$$

(f) 1.679 ÷ 100

$$\frac{1.679}{100} = 0.01679$$

(g) 0.854 ÷ 1000

$$0.000\,\frac{0.854}{1000} = 0.000854$$

(h) 0.007 ÷ 100

$$\frac{0.007}{100} = 0.00007$$

(i) 18.408 ÷ 100

$$\frac{18.408}{100} = 0.18408$$

(j) 108.5 ÷ 50 = 2.17

$$\begin{array}{r} 2.17 \\ 50\overline{)\,108.5} \\ -\,100 \\ \hline 85 \\ -\,50 \\ \hline 350 \\ -\,350 \\ \hline 0 \end{array}$$

(k) $305.8 \div 1000$

$\frac{305.8}{1000} = 0.3058$

(l) $27.8 \div 10$

$\frac{27.8}{10} = 2.78$

(m) $486.8 \div 50 = 9.136$

$$
\begin{array}{r}
9.736 \\
50 \overline{)\,486.8} \\
-\,450 \\
\hline
368 \\
-\,350 \\
\hline
180 \\
-\,150 \\
\hline
300 \\
-300 \\
\hline
0
\end{array}
$$

(n) $200.48 \div 100$

$\frac{200.48}{100} = 2.0048$

(o) $28.67 \div 50$

$$
\begin{array}{r}
0.5734 \\
50 \overline{)\,28.67} \\
-\,250 \\
\hline
367 \\
-\,350 \\
\hline
170 \\
-\,150 \\
\hline
200 \\
-200 \\
\hline
0
\end{array}
$$

4. (a) $8.9 \div 3 = 0.296$

$\frac{8.9 \times 10}{3 \times 10} = \frac{89}{3}$

$$
\begin{array}{r}
0.296 \\
30 \overline{)\,89} \\
-\,60 \\
\hline
290 \\
-\,270 \\
\hline
200 \\
-\,180 \\
\hline
20
\end{array}
$$

(b) $40.05 \div 8 = 5.625$

$\frac{40.05}{8} \times \frac{100}{100} = \frac{4005}{800}$

$$
\begin{array}{r}
5.00625 \\
800 \overline{)\,4005} \\
-\,4000 \\
\hline
5000 \\
-\,4800 \\
\hline
2000 \\
-\,1600 \\
\hline
4000 \\
-4000 \\
\hline
0
\end{array}
$$

(c) $7 \div 15$

$= 0.466$

$$
\begin{array}{r}
0.466 \\
30 \overline{)\,70} \\
-\,60 \\
\hline
100 \\
-\,90 \\
\hline
100 \\
-\,90 \\
\hline
10
\end{array}
$$

(d) $1.56 \div 1.5 = 1.04$

$\frac{1.56}{1.5} \times \frac{100}{100} = \frac{156}{150}$

$$
\begin{array}{r}
1.04 \\
150 \overline{)\,156} \\
-\,150 \\
\hline
600 \\
-\,600 \\
\hline
0
\end{array}
$$

(e) $11.13 \div 4.1 = 2.71$

$\frac{11.13}{4.1} \times \frac{100}{100} = \frac{1113}{410}$

$$
\begin{array}{r}
2.71 \\
410 \overline{)\,1113} \\
-\,820 \\
\hline
2930 \\
-\,2870 \\
\hline
0600 \\
-\,410 \\
\hline
190
\end{array}
$$

(f) $12.42 \div 2.4 = 5.175$

$$\frac{12.42}{2.4} \times \frac{10}{10} = \frac{124.2}{2.4}$$

$$\begin{array}{r} 5.175 \\ 24\overline{)124.2} \\ -\ 120 \\ \hline 42 \\ -\ 24 \\ \hline 180 \\ -\ 168 \\ \hline 120 \\ -120 \\ \hline 0 \end{array}$$

(g) $22.95 \div 6.5 = 3.53$

$$\frac{22.95}{6.5} \times \frac{100}{100} = \frac{22.95}{650}$$

$$\begin{array}{r} 3.53 \\ 650\overline{)2295} \\ -\ 1950 \\ \hline 3450 \\ -\ 3250 \\ \hline 2000 \\ -\ 1950 \\ \hline 500 \end{array}$$

(h) $37.96 \div 7.2 = 5.27$

$$\frac{37.96}{7.2} \times \frac{100}{100} = \frac{3796}{720}$$

$$\begin{array}{r} 5.27 \\ 720\overline{)3796} \\ -3600 \\ \hline 1960 \\ -1440 \\ \hline 5200 \\ -5040 \\ \hline 160 \end{array}$$

(i) $375.8 \div 6.5$

$$\frac{375.8}{6.5} \times \frac{10}{10} = \frac{3758}{65} = 57.81$$

$$\begin{array}{r} 57.81 \\ 65\overline{)3758} \\ -\ 325 \\ \hline 508 \\ -\ 455 \\ \hline 538 \\ -\ 520 \\ \hline 80 \\ -65 \\ \hline 15 \end{array}$$

(j) $0.759 \div 2 = 0.3795$

$$\frac{0.759}{2} \times \frac{1000}{1000} = \frac{759}{2000}$$

$$\begin{array}{r} 0.3795 \\ 2000\overline{)7590} \\ -\ 6000 \\ \hline 15900 \\ -\ 14000 \\ \hline 19000 \\ -\ 18000 \\ \hline 10000 \\ -\ 10000 \\ \hline 0 \end{array}$$

(k) $5.134 \div 1.3 = 3.94$

$$\frac{5.134}{1.3} \times \frac{1000}{1000} = \frac{5134}{1300}$$

$$\begin{array}{r} 3.94 \\ 1300\overline{)5134} \\ -\ 3900 \\ \hline 12340 \\ -\ 11700 \\ \hline 6400 \\ -\ 5200 \\ \hline 1200 \end{array}$$

Exercise 2.5

1. (a) $1m = \frac{1}{1000}km$

$5m = \frac{5}{1000}km$

$= 0.005km$

(b) $1m = 10cm$

$6m = (6 \times 100)cm$

$= 600cm$

(c) $1mm = \frac{1}{1000}$

$35m = \frac{35}{1000}mm$

$= 0.035mm$

(d) $1m = \frac{1}{1000}km$

$25m = \frac{25}{1000}km$

$= 0.025km$

(e) $1cm = \frac{1}{100}m$

$10cm = \frac{10}{100}m$

$= 0.10m$

(f) $1km = 1000m$

$1.5km = (1.5 \times 1000)m$

$= 1500m$

(g) $1m = 1000mm$

$0.046m = (0.046 \times 1000)mm$

$= 46mm$

(h) $1km = 1000m$

$0.65km = (0.6 \times 1000)m$

$= 650m$

(i) $1m = 100cm$

$52m = (52 \times 100)cm$

$= 5200cm$

(j) $1m = 1000mm$

$10m = (10 \times 1000)mm$

$= 10000mm$

(k) $1g = \frac{1}{1000}kg$

$5g = \frac{5}{1000}kg$

$5g = 0.005kg$

(l) $1kg = 1000g$

$0.075kg = (0.075 \times 1000)g$

$= 75g$

(m) $1kg = 1000g$

$7kg = (7 \times 1000)g$

$= 7000g$

(n) $1mm = \frac{1}{10}cm$

$712mm = \frac{712}{10}cm$

$= 71.2cm$

(o) $1kg = 1000g$

$7.7kg = (7.7 \times 1000)g$

$= 7700g$

(p) $1g = \frac{1}{1000}kg$

$960g = \frac{960}{1000}kg$

$= 0.960kg$

(q) $1cm = \frac{1}{100}m$

$9cm = \frac{9}{100}m$

$= 0.09m$

(r) $1mm = \frac{1}{10}cm$

$225mm = \frac{225}{10}cm$

$= 22.5cm$

2. (a) It will be a larger unit we multiply when we convert metres into centimeters.

(b) We divide by 10 when we change millimeters to centimetres.

3. (a) To the right by 2 decimal places

(b) To the right by 3 decimal places

(c) To the left by 3 decimal places

(d) To the left by 3 decimal places

4. Weight of bag of rice: 6.5kg

Weight of bag of rice: in g = 6.5kg

1kg = 1000g

$6.5kg = (6.5 \times 1000)g = 6500g$

Exericse 2.6

1. Let the number be x

x + 6.419 = =, x = 9 – 6.419, x = 9.000 – 6.419

x = 2.581, Hence, 2.581 should be added to 6.419 to get 9.

2. Let the number be x

x + (12.45 – 8.75) = 15.05 15.05 – 3.70 = x

x + (3.70) = 15.05 x = 11.35

3. Sum of 18.36 and 15.08 = 33.44

Difference of 18.36 and 15.18 = 3.28

Difference of sum and difference of 18.36 and 15.08 = 30.16

Answer: Sum fof 18.36 and 15.08 is greater by their difference by 30.16.

4. Sum of 898 and 676.49 = 1574.49

Difference of 898 and 676.49 = 221.51

Differece of sum and difference of 898 and 676.49 = 1352.98

The difference 898 and 676.49 is less than its sum by 1352.98

5. 1 dozen = 12

Cost of each egg = ₹4.25

Cost of dozen egges = ₹12 × 4.25

= ₹51

Answer: Cost of dozen egges is ₹51.

6. Number of days in a week = 7 days

Quantity of sugar used every week = 75.5kg

Quantity of Sugar on each day = $\frac{75.5}{7}$kg = 10.7857kg

Answer: 10.7857 of sugar is used every day.

7. Cost of 1 pair of shoes: ₹248

Cost of 1 pair socks: ₹28

Set of shoes and socks that can be bought for ₹1988

= 1988 should be distributed in such away their it can have multiples of both 248& 28.

1988 = 1736 + 252

= (248 × 7) + (252 × 9)

Hence, 7 pairs of shoes & 9 pair of socks can be bought for ₹1988.

8. Cost of 1 video game: ₹570.20

Cost of 4 video games: ₹(570.20 × 4)

= ₹2280.80

Amount before Saving = Total money spent – Money added to saving

= ₹(228.80 – 275.75)

= ₹2005.05

He had ₹2005.05 before he added ₹275.75 into his saving.

9. Distance covered by Rohan in a 100m race before felding down: 68.8m

Distance left to covered = 100m – 68.8m

= 31.2m

Distance covered in each step = 0.7m

Steps take in 31.2 = $\frac{31.2}{0.7}$

= 45 (Approx)

Hence, 45 steps are remainded for Rohan to finish the race.

10. Let the total stregth of the school be x.

Number of boys = 0.8 part of the total strength

= $\frac{8}{10}$ of x = $\frac{8x}{10}$

Number of boys + Number of girls = Total strength of the boys

$\frac{8x}{10}$ + 150 = x = $\frac{8x}{10}$ + $\frac{150}{1}$ = x

$\frac{8x + 1500}{10}$ = x , 8x + 1500 = 10 x ×

1500 = 10x – 8x

1500 = 2x

x = $\frac{1500}{2}$, x = 750

$\frac{8x}{10}$ = $\frac{8}{\cancel{10}}$ × 75$\cancel{0}$ = 600

Therefore, there are 600 total boys in the school.

11. Total amount of money distributed by yogesh = ₹1840

Total amount of money each police personnel received =

$$\frac{\text{Total money distributed}}{\text{Amount each police personnel recieved}} = ₹\frac{1840}{28.75} = 64$$

Hence, Yogesh had distributed ₹28.75 to 64 police personnels.

12. Cost of 15.5 litres of oil: ₹1852.25

Cost of 1 litres of oil: $₹\frac{1852.25}{15.5}$ = ₹119.5

Cost of 1 litre of oil is ₹119.5.

Review Exercise

1. (a) $\frac{2}{3} \div \frac{2}{5} = \frac{2}{3} \times \frac{5}{2} = \frac{10}{6} = \frac{5}{3}$

(b) $12 \div \frac{3}{5} = 12 \times \frac{5}{3} = \frac{60}{3} = 20$

(c) $15 \div \frac{1}{5} = 15 \times 5 = 75$

(d) $5 \div \frac{4}{9} = 5 \times \frac{9}{4} = \frac{45}{4}$

(e) $5\ \frac{1}{4} \div \frac{1}{12} = \frac{21}{4} \times 12 = \frac{252}{4} = 63$

(f) $\frac{8}{3} \div 3\frac{7}{8} = \frac{8}{3} \times \frac{8}{31} = \frac{64}{93}$

(g) $4\frac{2}{3} \div 1\frac{3}{8} = \frac{14}{3} \times \frac{8}{11} = \frac{112}{33}$

(h) $5\frac{7}{12} \div 2\frac{1}{3} = \frac{67}{28} \div \frac{7}{3} = \frac{67}{28} \times \frac{3}{7} = \frac{201}{196}$

(i) $10 \div 10\frac{1}{4} = 10 \times \frac{4}{41} = \frac{40}{41}$

(j) $\frac{5}{6} \div 4\frac{1}{3} = \frac{5}{6} \times \frac{3}{13} = \frac{15}{78} = \frac{5}{26}$

2. (a) $5\frac{1}{3}$, 5, $4\frac{2}{3}$, $4\frac{1}{3}$ 4, $3\frac{2}{3}$, $3\frac{1}{3}$(Subtraction of $\frac{1}{3}$)

(b) 5, $2\frac{1}{2}$, $1\frac{1}{4}$, $\frac{5}{8}$, $\frac{5}{16}$, $\frac{5}{32}$, $\frac{5}{64}$ (Division by 2)

(c) $4\frac{1}{6}$, $4\frac{1}{3}$, $4\frac{1}{2}$, $4\frac{2}{3}$, $4\frac{5}{6}$, $\frac{5}{1}$, $5\frac{1}{6}$ (Addition of $\frac{1}{6}$)

(d) 36, 9, $2\frac{1}{4}$, $\frac{9}{16}$, $\frac{9}{64}$, $\frac{9}{256}$, $\frac{9}{1024}$ (Division by 4)

(e) $\frac{3}{32}$, $\frac{3}{16}$, $\frac{3}{4}$, $\frac{3}{2}$, 3 (Multiplication by 2)

(f) $18\frac{2}{3}$, 18, $17\frac{1}{3}$, $16\frac{2}{3}$, 16, $15\frac{1}{3}$, $14\frac{2}{3}$ (Subtracting of $\frac{2}{3}$)

3. 1decade = 10 years

1 year = 12 month

10 years = (10 × 12)months

= 120 months

$\frac{2}{5}$ of a decade = ($\frac{2}{5}$ × 120) months

= 48 months

4. 1kg = 1000g

2kg = (2 × 1000)g = 2000g

($\frac{2}{3}$ × 2000)g

$= \frac{4000}{3}$ = 1333.33kg

5. Length of cloth uses to make pair of unifrom

$= 1\frac{2}{3}\text{m} = \frac{3 \times 1 + 2}{2} = \frac{3 + 2}{2}\text{m}$

$= 7\frac{5}{2}\text{m}$ = 25m

Number of students = 120

Length of cloth needed for 120 students = (120 × 2.5)m

= 300m

Answer: 300m of cloth is required for 120 students.

6. (a)

$$\begin{array}{r} 3.5 \\ \times\ 4.5 \\ \hline 175 \\ +\ 140\times \\ \hline 1575 \end{array}$$

3.5 = 1 decimal places

4.5 = 1 decimals places

= 2 decimls places 15.75

(b)

$$\begin{array}{r} 625 \\ \times\ 06 \\ \hline 3750 \end{array}$$

6.25 – 2 decimal places

= 0.6 = 1 Decimaal place

3750 = 3.750

(c)

			1	2	5
×			0	0	5
			6	2	5
		0	0	0	×
	0	0	0	×	×
	0	0	6	2	5

112.5 – 1 decimals places

0.05 = 2 decimals places

00625

= 0.625

(d)

			4	1	2
×			1	0	5
		2	0	6	0
		0	0	0	×
	4	1	2	×	×
	4	3	2	6	0

4.12 = 2 decimal places

1.05 = 2 decimal place

= 4.3260

(e)

				5	6	4
×			0	1	2	5
			2	8	2	0
		1	1	2	8	×
+		5	6	4	×	×
	0	0	0	×	×	×
	0	7	0	5	0	0

5.64 = 2 decimal places

0.125 = 3 decimal places

70500

= 0.70500

(f)

				5	9	4	
×			0	4	2	1	2
				1	1	8	8
				5	9	4	×
		1	1	8	8	×	×
	2	3	7	6	×	×	×
	0	0	0	×	×	×	×
	2	5	0	1	9	2	8

5.94 = 2 decimal place

0.4212 = 4 decimal place

= 6 decimal places

2.501928

7. (a) $\frac{23.2}{2.4} = \frac{23.2 \times 10}{2.4 \times 10} = \frac{232}{24}$

$$
\begin{array}{r}
9.66 \\
24\overline{)\,232} \\
-\,216 \\
\hline
160 \\
-\,144 \\
\hline
160 \\
-\,144 \\
\hline
16
\end{array}
$$

$\frac{23.2}{2.4} = 9.66$

(b) $\frac{15.6}{1.3} = \frac{15.6 \times 10}{1.3 \times 10} = \frac{156}{13}$

$$
\begin{array}{r}
12 \\
13\overline{)\,156} \\
-\,13 \\
\hline
26 \\
-\,26 \\
\hline
0
\end{array}
$$

$\frac{15.6}{1.3} = 12$

(c) $\frac{42.75}{4} = \frac{42.75 \times 100}{4 \times 100} = \frac{4275}{400}$

$$\begin{array}{r} 10.68 \\ 400\overline{)\,4275} \\ -\,400 \\ \hline 2750 \\ -\,2400 \\ \hline 3500 \\ -\,3200 \\ \hline 300 \end{array}$$

$\frac{42.75}{4} = 10.68$

(d) $\frac{19.68}{6.13} = \frac{19.68 \times 100}{613 \times 1} = \frac{1968}{613}$

$$\begin{array}{r} 3.21 \\ 613\overline{)\,1968} \\ -\,1839 \\ \hline 1290 \\ -\,1226 \\ \hline 640 \\ -\,613 \\ \hline 27 \end{array}$$

$\frac{19.68}{6.13} = 3.21$

(e) $\frac{5.018}{3.12} = \frac{5.048 \times 1000}{3.12 \times 1000} = \frac{5048}{3120}$

$$\begin{array}{r} 1.61 \\ 3120\overline{)\,5048} \\ -\,3120 \\ \hline 19280 \\ -\,18720 \\ \hline 5600 \\ -\,3120 \\ \hline 2480 \end{array}$$

$\frac{5.018}{3.12} = 2.480$

(f) $2.8018 \div 5.49$

$\frac{2.8018}{5.49} \times \frac{1000}{1000} = \frac{28018}{549000}$

$$\begin{array}{r} 0.510 \\ 54900\overline{)\,280180} \\ -\,274500 \\ \hline 568000 \\ -\,549000 \\ \hline 129000 \end{array}$$

$\frac{2.8018}{5.49} = 0.510$

8. (a) $1\text{cm} = \frac{1}{100}\text{m}$

$5\text{cm} = \frac{5}{100}\text{m}$

$= \boxed{0.05}\text{m}$

(b) $1\text{kg} = 1000\text{g}$

$2.56\text{kg} = (2.5 \times 1000)\text{g}$

$= \boxed{2560}\text{g}$

(c) $1\text{mm} = \frac{1}{1000000}\text{ km}$

$165\text{mm} = \frac{165}{1000000}\text{km} = \boxed{0.000165}\text{ km}$

(d) $3.763 \times \boxed{1000} = 3763$

(e) $0.017 \times \square = 1.2$

$\square = \frac{1.2}{0.014}$

$\frac{1.2 \times 1000}{0.014 \times 1000} = \frac{1200}{14} = \boxed{85.71}$

(f) $1000 = 6.8$

$\square = \frac{6.8}{1000}$

$= \boxed{0.0068}$

(g) $\square \times = 0.05$

$\square = \frac{0.05}{10}$

$\square = 0.005$

(h) $13.21 \div \square = 1.321$

$13.21 = 1.321 \times \square$

$\square = \frac{13.21}{1.321}$

$\square = 10$

(i) $0.25 \div \square = 0.00025$

$0.25 = 0.00025 \times \square$

$\square = \frac{0.25}{0.00025}$

$\square = 1000$

(j) $\square \div 10 = 79.3$

$\square = 79.3 \times 10$

$\square = 793$

(k) $\square \div 100 = 0.045$

$\square = 0.045 \times 100$

$\square = 4.5$

9. Time at which Rahul leaves his home = Time at which school starts – Time taken to reach the school

= 8:00am – 0.75 hours

8:00am = 8hours = 8 hours – 0.75 hours

= 0.75 hours = (60 × 0.75)minutes

= 7:15am

= 45 minutes

Hence, Rahul leaves his home at 7:15 AM.

Time at which Rahul comes back to home after school: Time at which school ends + Time taken to come back have from School

(8.am + 5.25 hours) + 0.75 hours

= (8 + 5.25 hours) + 0.75 hours

(13.25 + 0.75) hours

Therefore, he comes back home at 2:00pm

10. (a) $\text{km} = \frac{1}{100}\text{m}$

$15\text{cm} = \frac{15}{100}\text{m}$

$= 0.15\text{m}$

(b) $\text{km} = \frac{1}{100}\text{m}$

$45\text{cm} = \frac{45}{100}\text{m}$

$= 0.45\text{m}$

(c) $1\text{m} = \frac{1}{1000}\text{mm}$

$75\text{m} = \frac{75}{1000}\text{mm}$

$= 0.075\text{mm}$

(d) $\text{km} = \frac{1}{100}\text{m}$

$25\text{cm} = \frac{25}{100}\text{m}$

$= 02.5\text{m}$

(e) $\text{km} = \frac{1}{100}\text{m}$

$30\text{cm} = \frac{30}{100}\text{m}$

$= 0.30\text{m}$

11. (a) 1kg = 1000g

$0.5\text{kg} = 0.5 \times 1000\text{g}$

$= 500\text{g}$

(b) 1kg = 1000g

$0.485\text{kg} = 0.485 \times 1000\text{g}$

$= 485\text{g}$

(c) 1kg = 1000g

$0.317\text{kg} = 0.317 \times 1000\text{g}$

$= 317\text{g}$

(d) 1kg = 1000g

$0.46\text{kg} = 0.46 \times 1000\text{g}$

$= 460\text{g}$

(e) 1kg = 1000g

$1.3\text{kg} = 1.3 \times 1000\text{g}$

$= 1300\text{g}$

12. (a) $1\text{m}l = \frac{1}{1000}l$

$5000\text{m}l = \frac{5000}{1000}l$

$= 5l$

(b) $1\text{k}l = 1000l$

$2.5\text{k}l = 2.5 \times 1000l$

$= 2500l$

(c) $1\text{k}l = 1000l$

$7.35\text{k}l = 7.35 \times 1000l$

$= 7350l$

(d) $1\text{k}l = 1000l$

$0.85\text{k}l = 0.85 \times 1000l$

$= 850l$

(e) $1\text{k}l = 1000l$

$0.5\text{k}l = 0.5 \times 1000l$

$= 500l$

(f) 5.76kl

1kl = 1000l

5.76kl = 5.76 × 1000l

= 5760l

13. (a) 1mm = $\frac{1}{1000}$m

215mm = $\frac{215}{1000}$m

= 0.215mm

(b) 1cm = $\frac{1}{100}$m

5.47cm = $\frac{5.47}{100}$m

= 0.0547m

(c) 1 cm = $\frac{1}{100}$m

65cm = $\frac{65}{100}$m

= 0.65m

(d) 1mm = $\frac{1}{1000}$m

75mm = $\frac{75}{1000}$m

= 0.075m

(e) 1mm = $\frac{1}{1000}$m

1235mm = $\frac{1235}{1000}$m

= 1.235m

15. Part of book Soumya reads everyday = 0.1710

Number of days required to complete the book

$= \frac{\text{Part of book left to read}}{\text{Part of book read by Soumya everyday}} = \frac{1-0.15}{0.171}$

$= \frac{0.85}{0.171} = 4.97$

Hence, Soumya will require approx 5 day to complete the book.

16. 1m = 2.4854 feet

10m = (2.4854 × 10) feet

= 24.845 feet

17. 1 inch = 2.54cm

73.92cm = $\frac{73.92}{23.54}$inch

= 29.102 inches

18. 0.4($\frac{4}{10}$) part of the ornamental chain is made up of gold.

Let the whole chain = x

A weight of the whole chain = 9.3g

Amount of gold in the whole chain = $\frac{4x}{10}$

A weight of gold in the whole chain

$= \frac{4\times 9.3}{10} = 3.72$g

Each piece have gold = $\frac{3.72}{6}$

= 0.62g

19. Money saved by Aryan in 1 month =

$\frac{\text{Money sace in 3 month}}{3} = ₹\frac{485.40}{3} = ₹161.8$

Let Aryan's Pocket money be x

Aryan's Pocket money = Part of money spent + Amount saced in one month

x = 0.8x + ₹161.8

x – 0.8x = ₹161.8

0.2x = ₹161.8

x = $₹\frac{161.8}{0.2}$ = ₹809

Part of Mrs Sharma's salary given to his son = 0.025

Let Mrs. Sharma's salary by y

0.025y = ₹809

y = $\frac{₹809}{0.025}$ = ₹32, 360

Mrs.sharma's salary is ₹32, 360

20. Part of the pole in the water = 1– part above the water level of pole

1 – 0.25 = 0.75

Depth of water = 0.75 part of pole

= 0.75 × 7.20m

$= \frac{75}{100} \times \frac{720}{100}$m = $\frac{5400}{1000}$ = 5.4m

Hence, the depth of water is 5.4m.

Multiple Choice Question

1. $5\frac{6}{10}2 \times 1\frac{2}{3}1 = \frac{2\times 1}{5\times 1} = \frac{2}{5}$ (b) $\frac{2}{5}$

2. $\frac{2}{5} \times \frac{5}{2} = 1$, Hence, the reciprocal is $\frac{5}{2}$

(d) $\frac{5}{2}$

3. $\frac{7}{10} \div 1 = \frac{7}{16} \times \frac{1}{1} = \frac{7}{16}$ (b) $\frac{7}{16}$

4. $\frac{1}{3} \div 5 = \frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$ (c) $\frac{1}{15}$

5. $2\frac{\cancel{7}1}{\cancel{16}} \times 4\frac{\cancel{8}1}{\cancel{28}} = \frac{1 \times 1}{2 \times 4} = \frac{1}{8}$ (d) $\frac{1}{8}$

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

7. $\frac{0}{1} = \frac{0}{1}$ (d) does not exist as we cannot divide any number by 0.

8. $3\cancel{6} \times \frac{5}{\cancel{8}\,4} = \frac{9}{4}$ (b) $\frac{9}{4}$

9. $64 \div \frac{16}{10} = 4\frac{\cancel{64}}{1} \times \frac{10}{\cancel{16}\,1} = \frac{4 \times 10}{1 \times 1} = \frac{40}{1} = 40$

(c) 40

10. $1\cancel{17} \times \frac{1}{\cancel{17}\,1} = 1$ (d) $\frac{1}{17}$

11. $2.5 \times 3.5 = 8.75$

$$\begin{array}{r} 2.5 \\ \times\ 3.5 \\ \hline 125 \\ +\ 75\times \\ \hline 675 \end{array}$$

2.5 = 1 decimal place

3.5 = 1 decimal place

= 2 decimal places

= 8.75 (c) 8.75

12. $0.75 \times 0.5 = 0.3$

$$\begin{array}{r} 0.75 \\ \times\ \ 05 \\ \hline 375 \\ +\ 000\times \\ \hline 0375 \end{array}$$

0.75 = 2 decimal places

0.5 = 1 decimal places

= 3 decimal places

= 0.375 (b) 0.375

13. 1.1×0.001

1.1 = 1 decimal place

0.001 = 3 decimal place

= 4 decimal place

$11 \times 0001 = 00011$

= 0.0011 (b) 0.0011

14. $25.25 \div 10 = 2.525$ (1 decimal place shifted towards the left) (d) 2.525

15. $9.008 \times 1000 = 9008$

1000 = 3zeroes

(3 decimal places shifted towards right)

(c) 9008

16. $39 \div 3.25$

$39 \div \frac{3.25}{100}$

$= 39 \times \frac{100}{325} = \frac{3900}{325} = 12$ (a) 12

17. $0.88 \div 1.1$

$\frac{0.88}{1.1} = \frac{0.88}{1.1} \times \frac{100}{100} = \frac{88}{110} = 0.8$

(c) 0.8

18. 1 kl = 1000l

8kl = (8 × 1000)l

= 8000l (a) 8000l

19. 1g – 10dg

0.5g = (0.5 × 10)dg

= 5dg

(a) 5dg

20. 1km = 10hm

5.5km = (5.5 × 10)hm

= 55hm

(b) 55hm

Check your Progress

1. $1\frac{\cancel{8}1}{\cancel{6}} \times 1\frac{\cancel{36}\,\cancel{6}3}{\cancel{5}\,\cancel{40}} \times 4\frac{\cancel{5}1}{\cancel{8}} = \frac{1 \times 3 \times 1}{1 \times 1 \times 4} = \frac{3}{4}$

2. 1.

3. Less

4. Yes

5. $6\frac{7}{12} \div \frac{91}{12} = \frac{79}{12} \div \frac{91}{12} = \frac{79}{\cancel{12}\,1} \times \frac{\cancel{12}1}{91} = \frac{79}{91}$

6. yes

7. $4\frac{1}{7} = \frac{4 \times 7 + 1}{7} = \frac{28 + 1}{7} = \frac{29}{7}$

Multiplication inverse of $\frac{29}{7} = \frac{7}{29}$ hence,

multiplicative inverse of $4\frac{1}{7}$ is $\frac{7}{29}$.

8. $\frac{3}{4} \div \frac{5}{4} = \frac{3}{\cancel{4}\,1} \times \frac{\cancel{4}\,1}{5} = \frac{3 \times 1}{1 \times 5} = \frac{3}{5}$

9. $1\frac{\cancel{13}\,1}{\cancel{12}} \times 1\frac{\cancel{12}\,1}{\cancel{13}} = 1$

10. $\frac{5}{11} \div 5 = \frac{\cancel{5}\,1}{11} \times \frac{1}{\cancel{5}\,1} = \frac{1 \times 1}{11 \times 1} = \frac{1}{11}$

11. Yes as they both have same vlaure equal number of total decimal places.

12. $0.008 \times 1000 = 8$ (1000 = 3 zeroes, Shifting 3 decimal places towards right)

13. $\frac{845.6}{100} = 8.456$ (100 = 2 zeroes, Shifting 2 decimal places towards left)

14. $7.56 \div 12 = 0.63$ (Shifting 2 decimal places towards left)

15. $\frac{0.63}{5} = 0.126$

16. $2.575 \div 2.575 = 1$

17. $0.8 \times (4.8 - 2.5)$

$0.8 \times (2.3)$

$= 1.84$

18. $1.1 \times 0.02 = 0.022$

19. $1\text{g} = \frac{1}{1000}\text{kg}$

$5515\text{g} = \frac{5515}{1000}\text{kg} = 5.515\text{kg}$

20. $1\text{m}l = \frac{1}{1000}l$

$4512\text{ml} = \frac{4512}{1000}l$

$= 4.512l$

3 Data handling

Exercise 3.1

1. Mean = $\frac{\text{Sum of all observations}}{\text{Number of observations}}$ = $\frac{6 + 4 + 7 + p + 10}{5}$

$\frac{27 + p}{5} = 8$

$27 + p = 8 \times 5$

$27 + p = 40$

$p = 40 - 27$

$p = 13$

2. There are 16 numbers, and their mean is 8.

Let their sum be S. So mean = $\frac{15}{S}$ =8.

If two is added to each number , the sum increases by $16 \times 2 = 32$.

To find the mean we divide by 16, so mean = $\frac{S + 32}{16} = 8 + 2 = 10$

Answer: Hence the new mean is 10

3. (a) Average score = mean

Mean player A = Score in $\frac{\text{Game 1, Game 2, Game 3 and Game 4}}{\text{Total number of games playes}}$

$= \frac{14 + 16 + 10 + 10}{4} = \frac{50}{4} = 12.5$

Mean of player B = Score in $\frac{\text{Game 1, Game 2, Game 3 and Game 4}}{\text{Total number of games playes}}$

$\frac{0 + 8 + 6 + 4}{4} = \frac{18}{4} = 4.5$

Mean player C = Scrore in $\frac{\text{Game 1, Game 2, Game 3 and Game 4}}{\text{Total number of games playes}}$

$= \frac{8 + 11 + 13}{3} = \frac{32}{3} = 10.66$

4. Given, 11, 12, 14, 18, (x + 2), (x + 4) , 30, 32 , 35 , 41 are in ascending order .

Number of terms = 10 {even}

so, median = {(n/2)th + (n/2 + 1)th}/2

24 = (5th + 6th)/2

24 = {(x + 2) + (x + 4)}/2

24 = (x + 3)

x = 21

Answer: Hence, x = 21

5. Given : Observations :31, 38, 27, 28, 36, 25, 35, 40

Arranging given numbers in ascending order: 25 , 27 , 28 , 31 , 35 , 36 , 38 , 40

Number of observations, (n) = 8 (even)

Median = ½[value of (n/2)th + (n/2 +1)th observations]

Median = ½[value of (8/2th + (8/2 + 1th) observations]

Median = ½ [value of (4th + 5th) observations]

Median = (31 + 35)/2

Median = 66/2 th

Median = 33

Hence, the median of the given data is 33.

6. 7, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 44, 45

Here, the number of observations n is 15(odd).

Since the number of observations is odd, therefore, Therefore median = ((n+1)/2)th term

Median = value of 8th term

Hence, median = 35 kg.

7. Arranging the numbers with the same values together, we get 1, 1, 1, 2, 2, 2, 2, 3, 4, 4

Mode of this data is 2 because it occurs more frequently than other observations.

8. Arranging the data in ascending order such that same numbers are put together, we get 32, 32, 34, 35, 35, 38, 42

Here, n=7

∴ Median = Value of (n+1)/2th observation = Value of 4th observation =35.

Here, 32 and 35 both occur twice.

∴ 32 and 35 are the two modes

9. Given numbers

50, 42, 35, 2x + 10, 2x − 8, 12, 11, 8, 6 are in descending order

Median is 25

Here we observe that

No. of observation is odd i.e. n=9

So median is (n+1/2) th term

from (I) 5 th term from data is 2x−8

Median =(9+1/2) th term

25 = 5 th term

25 = 2x − 8

2x = 25 + 8

2x = 33

x = 33/2

x=16.5

x value is 16.5

10. 53, 65, 72, 51, 69, 71, 83, 79, 65, 54, 56, 55, 53, 70, 82, 85,

68, 65, 73, 65, 77, 50, 66, 85, 88

No. of observations: 25

Data in ascending order: 50, 51, 53, 53, 54, 55, 56, 65, 65, 65, 65, 66, 68, 69, 70, 71, 72, 73, 77, 79, 82, 83, 85, 85, 88

No. of observations are odd

So, Median = (n + 1/2)th term

(25+1)/2th term= 26/2 th term

=13th term

=68

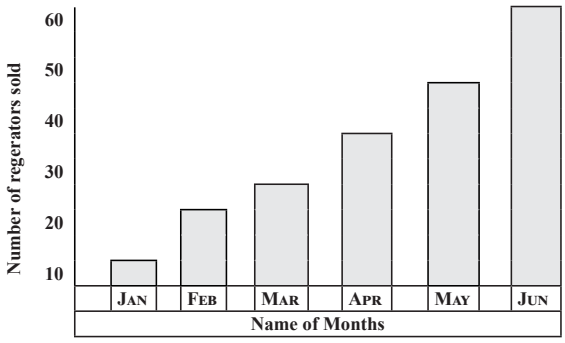
53, 65, 72, 51, 69, 71, 83, 79, 65, 54, 56, 55, 53, 70, 82, 85,

68, 65, 73, 65, 77, 50, 66, 85, 88

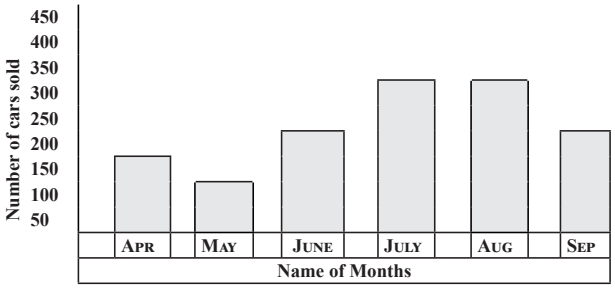
Mode: 65, appeared 4 times

Exercise 3.2

1.



2.



(a) May

(b) July

(c) Total Number of cars sold from April to June 170 + 130 + 175

= 475

Number of cars sold form July to September

180 + 170 + 160

= 510

510 – 475 = 35

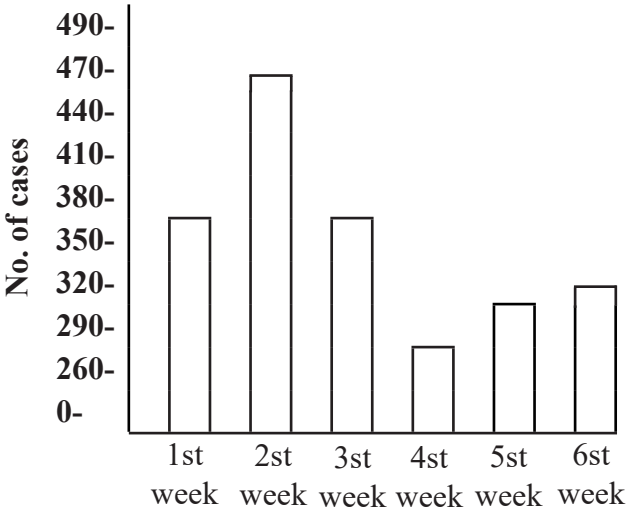
35 cars are more sold from July to september.

(d) Maximum Sale: Minimum sale

180 : 30

$$\frac{180}{130} = \frac{180 \div 10}{130 \div 10} = \frac{18}{13} = 18 : 13$$

3.



Multiple Choice Questions

1. Mean $= \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{84 + 28 + 34 + 26 + 57 + 74}{6} = \frac{293}{6} = 48.833$

(a) 48.833

2. Mean $= \frac{43 + 39 + 60 + 58 + 55 + 45}{6} = \frac{300}{6} = 50$ (a) 50

3. Arranging into ascending order

1, 3, 3, 4, 5, 6 and 7

n = 7 (odd number)

Median $= \left(\frac{n + 1}{2}\right)^{th}$ term $= \left(\frac{7 + 1}{2}\right)^{th}$ term $= \left(\frac{8}{2}\right)^{th} = 4^{th}$ term = 4 (a) 4

4. Mean $= \frac{\text{Sum of observations}}{\text{Number of observations}}$

$1203 = \frac{\text{Sum of observations}}{7}$

$1203 = 7 \times 1203$

1203 = 8421 (c) 8421

5. 3, 5, 1, 2, 4, 6, 0, 2, 2, 3, 5

Arranging into ascending order: 0, 1, 2, 2, 2, 3, 3, 4, 5, 5, 6

Mode = 2, covered 3 time

(b) 2

6. Mean $= \frac{13+9+8+41+6+12+25+30+35+26}{10} = \frac{205}{10} = 20.5$

(b) 20.5

7. (a) Frequency

8. (a) 9 occurred 10 times

9. (b) Medlan

10. Mean $= \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{P + q + r}{3}$

(d) $\frac{P + q + r}{3}$

Check your progress

1. (a) Arranging into ascending order

4, 5, 5, 8, 9, 9 and 11

Mode = 5 and 9 (occoured 2 times)

(b) Average, middle

(c) First five non – zro multiples of 3 = 3, 6, 9, 12 and 15

Mean $= \frac{3 + 6 + 9 + 12 + 15}{5} = \frac{45}{5} = 9$

(d) Range

2. (a) False, as Number values are repsting hence, the data has no mode.

(b) True

(c) False, as mean drives the average of the data.

(d) 17, 30, 38, 42

Alerady into ascending form.

Number of observatio = 4(Even)

Median $\frac{\text{Value of } \frac{n}{2}^{th} \text{ term + Value of } (\frac{n}{2}^{th} + 1) \text{ term}}{2}$

$= \frac{\frac{n}{2}^{th} \text{ term} + \frac{n}{2}^{th} \text{ term} + 1}{2}$

$= \frac{\text{2nd term + 3rd term}}{2}$

$\frac{30 + 38}{4} = \frac{68}{4} = 17$

Mode of 17, 30, 38, 42 does not exit as no valure are repeated hence, the statement is not true.

3. (a) The mean of 10 numbers is 45.

Sum of all 100 number $= 100 \times 45 = 4500$

The mean of last 99 numbers is 44.

Sum of all last 99 numbers $= 99 \times 44 = 4356$

= The first number = 4500 – 4356 = 144

(b) Assending order: –4, –2, 0, 3, 5, 6, 7

Number of observation = 7 (odd number)

Median $= \left(\frac{n + 1}{2}\right)^{th}$ term $= \left(\frac{7 + 1}{2}\right)^{th}$ term =

$\left(\frac{8}{2}\right)^{th}$ term $= 4^{th}$ term = 4

= 3 (iv) 3

(c) Ascending order: 4, 5, 5, 5, 5, 7, 7, 8, 8, 8, 8, 9, 9, 10

Mode = 8 (occoured 5 times) (iii) 8

(d) Ascending order: 6, 6, 7, 10, 11, 15, 22

Number of observation = 7 (odd number)

Mean $= \frac{6 + 6 + 7 + 10 + 11 + 15 + 22}{7}$

$= \frac{77}{7} = 11$

Mode = 6 (Occured 2 times)

Median $= \left(\frac{n + 1}{2}\right)^{th}$ term $= \left(\frac{7 + 1}{2}\right)^{th}$ term $= \left(\frac{8}{2}\right)^{th}$ term $= 4^{th}$ term $= 10$

Range ÷ Highest value: 2, Lowest value : 6

Range = Highest value – Lowest valure

$= 22 - 6 = 16$

(i) The range is 11.

4.

x	15	40	30	10	20	Number of observation
f	20	10	5	15	30	80

Number of observations = 80

Sum of observations = $15 \times 20 + 90 \times 10 + 30 \times 5 + 10 \times 15 + 20 \times 30$

$= 300 + 400 + 150 + 150 + 600$

$= 1600$

$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{1600}{80} = 20$

5. Number of observation = 6

Arithmetic mean $= \frac{3 + 5 + 6 + 2 + 10 + x}{6}$

$5 = \frac{26 + x}{6} = 30 = 26 + x = x = 30 - 26$

$x = 4$

6. $\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$

$3.5 = \frac{\text{Sum of observations}}{10}$

Sum of observations = 35

According to Questions

If two observation 3.5 and 2.5 are deleted

$\text{New Mean} = \frac{\text{Sum of observations } (3.5 + 2.5)}{\text{Number of observations}}$

$\frac{35 - 6}{8} = \frac{29}{8} = 3.625$

4 Simple Linear Equations

Exercise 4.1

1. (a) $\square + 8 = 20$

$\square = 20 - 8$

$\square = 12$

(b) $\square - 21 = 4$

$\square = 4 + 21$

$\square = 25$

(c) $\square + 9 = 68$

$\square = 68 - 9$

$\square = 59$

(d) $\square - 7 = -13$

$\square = -12 + 7$

$\square = -6$

(e) $\frac{1}{3} + \frac{2}{3} = \square$

$\frac{1+2}{3} = \square$

$\frac{3}{3} = \square$

$\square = 1$

(f) $\square + \frac{1}{7} = \frac{4}{7}$

$\square = \frac{4}{7} - \frac{1}{7}$

$\square = \frac{4-1}{7}$

$\square = \frac{3}{7}$

(g) $\square - 3 = 10$

$\square = 10 + 3$

$\square = 13$

(h) $18 - \square = 34$

$-\square = 34 - 18$

$-\square = 16$

$\square = -16$

2. (a) $\frac{p+5}{8} = 8$

$p + 5 = 8 \times 5$

$p + 5 = 64$

(b) $2(3y + 1) = 20$

$3y + 1 = \frac{20}{2}$

$3y + 1 = 10$

(c) $\frac{2x+3}{7} = 4$

$2x + 3 = 4 \times 7$

$2x + 3 = 28$

(d) $-t + 64 = 23$

$-t = 23 - 64$

$-t = -41$

$t = 41$

3. (a) $4 + y = -2$, $y = 2, 0, -6, 6$

Let $y = -2$

$4 + 3 = -2$

$6 \neq 2$

Hence, $y = 2$ does not Satisfies the equation

Let $y = 0$

$4 + 0 = 2$

$4 \neq 2$

Hence, $y \neq 0$ does not Satifies the equation

Let $y = -6$

$4 + (-6) = -2$

$4 - 6 = -2$

$-2 = -2$

Hence, $y = -6$ does not Satisfies the given equation.

Let $y = 6$

$4 + 6 = -2$

$10 \neq 2$

Hence, $y = 6$ Does not Satsifies the given equation.

(b) $2x = 16$; $x = 2, 8, 4$

Let $x = 2$

$2 \times (2) = 16$

$4 \neq 16$

Hence, $x = 2$ Does not Satisfies the equation

Let x = 8

$2 \times (8) = 16$

$16 = 16$

Hence, x = 8 Satisfies the equation

Let x = 4

$2 \times (4) = 16$

$8 \neq 16$

Hence, x = 4 does not Satisfies the equaiton

(c) $\frac{8x - 3}{3} = 7$; x = 0, –3, 3, 1

Let x be 0.

$\frac{8x\ (0) - 3}{3} = 7$

$\frac{0 - 3}{3} = 7$

$\frac{-3}{3} = 7$

$-1 \neq 7$

Hence, 9x = 0 does not Satisfies the equation

Let x be –3

$\frac{8x\ (-3) - 3}{3} = 7$

$= \frac{24 - 3}{3} = 7$

$\frac{-27}{3} = 7$

$-9 \neq 7$

Hence, x = –3 does not Satisfies the equation

Let x –3

$\frac{8x\ (3) - 3}{3} = 7$

$\frac{24 - 3}{3} = 7$

$\frac{21}{3} = 7$

$7 = 7$

Hence, x = 3 Satisfies the equation

Let the x = 1

$\frac{8 \times (1) - 3}{3} = 7$

$8 - 3 = 7 \times 3$

$5 \neq 21$

Hence x = 1 does not Satisfies the equation

(d) 7 – x = 3; x = 7, + 2, –, 4

Let x = 7

$7 - 7 = 3$

$0 \neq 3$

Hence, x = 7 does not Satisfies the equation

Let x = +2

$7 - (+2) = 2$

$7 - 2 = 3$

$5 \neq 3$

Hence, x = 2 does not Satisfies the equation

Let x = –2

$7 - (-2) = 3$

$7 + 2 = 3$

$9 \neq 3$

Hence x = –2 does not Satifies the equation.

Let x = 4

$7 - 4 = 3$

$3 = 3$

Hence, x = 4 satisfies the equation.

(e) – 6 + z = –8, z = 2, + 2, ––2, 4

Let z = 2

$-6 + 2 = 8$

$-4 \neq 8$

Hence, z = 2 does not Satisfies the equation

Let x = 4

$7 - 4 = 3$

$3 = 3$

Hence, x = 4 satisfies the equation

Let z = +2

$-6 + (+2) = -8$

$-6 + 2 = -8$

$-4 \neq 8$

Hence, z = 2 does not Satisfies the equation

Let z = –2

$-6 + (-2) = -8$

$-6 - 2 = -8$

$-8 \neq -8$

Hence, z = –2 Satisfies the given equation

Let z = 4

$-6\ (4) = -8$

$-2 \neq -8$

Hence, z = 4 does not Satisfies the equation

(f) $\frac{y}{2} = 6$, y = 6, 3, 4, 12, 0

Let + y = 6

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

$3 \neq 6$

Hence, y = 6 does not Satisfies the equation

Let y = 3

$\frac{3}{2} = 6$

$3 \neq 12$

Hence, y = 3 does not Satisfies the equation

Let y = 4

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

$6 = 6$

Hence y = 12 Satisfies the given equation

Let y = 0

$\frac{0}{2} = 6$

$0 \neq 6$

Hence, y = 0 does not the satisfies the equation

(g) $\frac{x}{5} + 7 = 13$; x = 4, 30, 5, –5

Let x = 4

$\frac{4}{5} + 7 = 13$

$\frac{4}{5} = 13 - 7$

$\frac{4}{5} = 6$

$4 = 6 \times 5$

4730

Hence, x = 4 does not satisfies the equation

Let x = 32

$\frac{30}{2}$ 4 7 = 13

$6 + 7 = 13$

$13 = 13$

Hence, x = 30 satisfies the equation

Let x = 5

$\frac{5}{5} + 7 = 13$

$1 + 7 = 13$

$8 \neq 13$

Hence x = 5 does not satisfies the equation

Let x = –5

$\frac{-5}{5} + 7 = 13$

$-1 + 7 = 13$

$6 \neq 13$

Hence, x = –5 does not satisfies the given equation.

4. (a) = 7

$2x = 7 \times 6$

$2x = 42$

$x = \frac{42}{2}$

$x = 21$

(b) $11 = \frac{2x}{4}$

$11 \times 4 = 2x$

$2x = 44$

$x = \frac{44}{2}$

$x = 22$

(c) $\frac{x}{54} = \frac{1}{6}$

$x \times 6 = 1 \times 54$

$6x = 54$

$x = \frac{54}{6}$

$x = 9$

(d) $\frac{p}{-3} = 4$

$p = 4 \times -3$

$p = -12$

(e) $\frac{x}{-7} = -7$

$x = -7 \times -7$

$x = 49$

(f) $\frac{y}{-10} = 4$

$y = 4 \times -10$

$y = -40$

(g) $\frac{y}{-12} = 3$

$x = 3 \times -12$

$x = -36$

(h) $\frac{y}{-7} = 2$

$y = 2 \times -7$

$y = -14$

(i) $35 = 39$

$5 = \frac{39}{3}$

$5 = 13$

(j) $4t = 60$

$t = \frac{60}{4}$

$t = 15$

(k) $7U = 56$

$U = \frac{56}{7}$

$x = 8$

(l) $7y = 0$

$y = \frac{0}{7}$

$y = 0$

(m) $-W = -18$

$W = \frac{-18}{-2}$

$W = 9$

(n) $-10x = -100$

$x = \frac{-100}{-10}$

$x = 10$

(o) $-4y = -16$

$y = \frac{-16}{-4}$

$y = 4$

(p) $-5z = -25$

$z = \frac{-25}{-5}$

$z = 5$

(q) $-3a = 51$

$a = \frac{51}{-3}$

$a = -17$

(r) $81 = -9b$

$b = \frac{81}{-9}$

$b = -9$

(s) $-x = 32$ (Subtraction both LHS & RHS)

$-(-x) = -(32)$

$x = -32$

(t) $5d = -60$

$d = \frac{-60}{5}$

$d = -12$

5. (a) $ax = b$ (Dividing both LHS & RHS from a)

$\frac{ax}{a} = \frac{b}{a}$

$x = \frac{b}{a}$

(b) $y = xz$

$\frac{y}{x} = \frac{xz}{x}$

$z = \frac{y}{x}$

(c) $C = Wd$

$\frac{C}{W} = \frac{Wd}{W}$ (Dividing both side by W)

$\frac{C}{W} = d$

(d) $1 = PRT$

$\frac{1}{PT} = \frac{PRT}{PT}$ (Dividing both side PT)

$R = \frac{1}{PT}$

(e) $V = 1bh$

$\frac{V}{bh} = \frac{1bh}{bh}$ (Dividing both Sides by bh)

$l = \frac{V}{bh}$

(f) $A = bh$

$\frac{A}{b} = \frac{bh}{b}$ (Dividing both sides by b)

$h = \frac{A}{b}$

(g) $\frac{x}{P} = q$

$\frac{x}{P} \times P \times q \times P$ (Multiplying both sides by P)

$X = qP$

(h) $\frac{x}{a} = c$

$\frac{x}{a} \times = c \times a$ (Multiplying both sides by a)

$x = ca$

6. (a) $6(y - 3) + 5 = 5$

$6y - 18 + 5 = 5$

$6y - 13 = 5$

$6y = 5 + 13$

$6y = 18$

$y = \frac{18}{6}$, $y = 3$

(b) $\frac{3 - y}{4} = 3$

$3 - y = 3 \times 4$

$3 - y = 12$

$-y = 12 - 3$

$-y = 9$

$y = -9$

(c) $(5y + 2) \div 4 = 3$

$5y + 2 = 3 \times 4$

$5y + 2 = 12$

$5y = 12 - 2$

$5y = 10$

$y = \frac{10}{5}$

$y = 2$

(d) $\frac{x + 2}{5} = 12$

$x + 2 = 12 \times 5$

$x + 2 = 60$

$x = 60 - 2$

$x = 58$

(e) $3(y - 1) + 6 = 12$

$3y - 3 + 6 = 12$

$3y + 3 = 12$

$3y = 12 - 3$

$3y = 9$

$y = \frac{9}{3}$

$y = 3$

(f) $3p + 4 = 31$

$3p = 31 - 4$

$3p = 27$

$p = \frac{27}{3}$

$p = 9$

(g) $7(2x - 5) = 63$

$2x - 5 = \frac{63}{7}$

$2x - 5 = 9$

$2x = 9 + 5$

$2x = 14$

$x = \frac{14}{2}$

$x = 7$

Exercise 4.2

1. (a) $X + 5 = 5$

$X = 5 - 5$

$X = 0$

Hence, root of given equation is 0

(b) $u + 4 = -16$

$u = -16 - 4$

$u = -20$

Hence, root of given equation is -20

(c) $u + 9 = 17$

$u = 17 - 9$

$u = 8$

Hence, root of given equation is 8

(d) $p + 20 = 100$

$p = 100 - 20$

$p = 80$

Hence, root of given equation is 80

(e) $y = 7 = 3$

$y = 3 + 7$

$y = 10$

Hence, root of given equation is 10

(f) $q - 2 = -20$

$q = -20 + 2$

$q = -18$

Hence, root of given equation is -18

(g) $x + 19 = 20$

$x = 20 - 19$

$x = 1$

Hence, root of given equation is 1

(h) $x + 110 = 100$

$x = 100 - 110$

$x = -10$

Hence, root of given equation is –10

(i) $p - 2 = -6$

$p = -6 + 2$

$p = -4$

Hence, root of given equation –4

(j) $p - 60 = -77$

$p = -77 + 60$

$p = -17$

Hence, root of given equation –17

(k) $p + 80 = 100$

$p = 100 - 80$

$p = 20$

Hence, root of given equation 20

(l) $s + 80 = 60$

$s = 60 - 80$

$s = -20$

Hence, root of given equation –20

(m) $x - 9 = 5$

$x = 5 + 9$

$x = 14$

Hence, root of given equation 14

(n) $x - 14 = -31$

$x = -31 + 14$

$x = -17$

Hence, root of given equation –15

(o) $y + 12 = 73$

$y = 73 - 12$

$y = 61$

Hence, root of given eqation 61

(p) $x - 3 = -40$

$x = -40 + 3$

$x = -37$

Hence, root of given equation 37

2. (a) Root = 4

$(x - 3) + (x - 2) = 3$

$(4 - 3) + (4 - 2) = 3$

$1 + 2 = 3$

$3 = 3$

Hence, 4 is the root of the given equation.

(b) Root = 7

$12x = 84$

$12 \times 7 = 84$

$84 = 84$

Hence, 7 is the root of the given equation.

(c) Root = 6

$2x - 3 = 9$

$(2 \times 6) - 3 = 9$

$12 - 3 = 9$

$9 = 9$

Hence, 9 is the root of the given equation.

(d) Root = –3

$x^2 = 9$

$(-3)^2 = 9$

$9 = 9$

Hence, 9 is the root of the given equation.

(e) Root = –4

$2(x + 4) = 0$

$2(-4 + 4) = 0$

$2(0) = 0$

$0 = 0$

Hence, –4 is the root of the give equation.

(f) Root = 11

$$\frac{x + 1}{2} + \frac{x + 3}{4} = 13$$

$$\frac{11 + 1}{2} + \frac{11 + 3}{2} = 13$$

$$\frac{12}{2} + \frac{14}{2} = 13$$

$6 + 7 = 13$

$13 = 13$ Hence, 11 is the root of the give equation.

(g) Root = –1

$x^4 - 2 = -1$

$(-1)^4 - 2 = -1$

$1 - 2 = -1$

$-1 = -1$ Hence –1 is the root of the give equation

3. (a) $3x + 5 = 17$

$3x = 17 - 5$

$3x = 12$

$x = \frac{12}{3}$

$x = 4$

(b) $\frac{x + 18}{3} = 6$

$x + 18 = 6 \times 3$

$x + 18 = 18$

$x = 18 - 18$

$x = 0$

(c) $2t + 9 = 20$

$2t = 20 - 9$

$2t = 11$

$t = \frac{11}{2}$

(d) $3p\ 12 - 15$

$3p = 15 + 12$

$3p = 27$

$p = \frac{27}{3}$, $p = 9$

(e) $8y + 7 = -23 + 3y$

$7 + 23 = 3y - 8y$

$30 = -5y$

$y = \frac{30}{-5}$

$y = -6$

(f) $11x - 8 = 41$

$11x = 41 + 8$

$11x = 49$

$x = \frac{49}{11}$

(g) $16x - 3 = -7$

$16x = -7 + 3$

$16x = -4$

$x = \frac{-4}{16}$

$x = \frac{-1}{4}$

(h) $\frac{y}{10} - 12 = 9$

$\frac{y}{10} = 9 + 12$

$\frac{y}{10} = 21$

$y = 21 \times 10$

$y = 210$

(i) $8p = 6p + 10$

$8p - 6p = 10$

$2p = 10$

$p = \frac{10}{2}$

$p = 5$

(j) $4y = -2y + 31$

$4y + 2y = 31$

$6y = 31$

$y = \frac{31}{6}$

(k) $-p = 2 + p$

$-p - p = 2$

$p = \frac{2}{-2}$

$p = -1$

(l) $3(y + 1) = 6$

$3y + 3 = 6$

$3y = 6 - 3$

$3y = 3$

$y = \frac{3}{3}$

$y = 1$

(m) $30 = 6(8 + x)$

$30 = 48 + 6x$

$30 - 48 = 6x$

$6x = -18$

$x = \frac{-18}{6}$

$x = -3$

(n) $\frac{2t + 3}{7} = 5$

$2t + 3 = 5 \times 7$

$2t + 3 = 35$

$2t = 35 - 3$

$2t = 32$

$2t = 32$

$t = \frac{32}{2}$

$t = 16$

(o) $\frac{x}{3} + 5 = 20$

$\frac{x}{3} = 20 - 5$

$\frac{x}{3} = 15$

$x = 15 \times 3$

$x = 45$

(p) $3(x - 5 = 4$

$3x - 15 = 4$

$3x = 4 + 15$

$3x = 19$

$x = \frac{19}{3}$

Exercise 4.3

1. (a) Let the number be x

$\therefore x + 45 = 80 - 5$

$x + 45 = 75$

$x = 75 - 45$

$x = 30$

(b) Let the first number be x

Second number = 8x

$8x - x = 56$

$7x = 56$

$x = \frac{56}{7}$

$x = 8$

$8x = 8 \times 8 = 64$

Hence, the numbers are 8 & 64

(c) Let the number be x

Second number = 5x

$x + 5x = 30$

$6x = 30$

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

$x = 5$

$5x = 5 \times 5 = 25$

Hence the numbers are 5 & 25.

(d) Let the number be x

$\frac{1}{2} \times x = 2x - 24$

$0.5x = 2x - 24$

$0.5x + 24 = 2x - 24 + 24$

(Adding 24 to both the sides)

$0.5\ x + 24 = 2x$

$24 = 2x - 0.5x$

$24 = 1.5x$

$x = \frac{24}{1.5}$

$x = 16$

(e) Let the cost of pen be x

Cost of book = 2x

$x + 2x = 48$

$3x = 48$

$x = \frac{48}{3}$

$x = 16$

2. (a) Let the number be x

$\frac{3}{4}$ of $x = 17$

$\frac{3}{4}x = 17$

$x = 17 \div \frac{3}{4}$

$x = 17 \times \frac{4}{3}$

$x = \frac{68}{3}$

$x = 22.66$

(b) Let the number be x

$\frac{4}{5}$ of $x = 60$

$\frac{4}{5}x = 60$

$x = 60 \div \frac{4}{5}$

$x = 15 \times \frac{5}{1}$

$x = 15 \times 5$

$x = 75$

(c) Let the number be x

$x + \frac{1}{2}$ of $x = 54$

$x + \frac{1}{2}x = 54$

$x + 0.5x = 54$

$1.5x = 54$

$x = \frac{54}{1.5}$

$x = 36$

(d) Let the number be x

$3 \times x = 690$

$3x = 690$

$x = \frac{690}{3}$

$x = 230$

(e) Let the cost of 1notebook be x

Cost of 5 notebooks $= 5 \times x$

$= 5x$

$5x = 90$

$x = \frac{90}{5}$

$x = 18$

Hence, the cost of 1 notebook is ₹18.

(f) Let the weight of brother be x.

Weight of girls $= \frac{2}{3}$ of x.

$\frac{x}{1} + \frac{2x}{3} = 85$

$5x = 85 \times 3$

$5x = 255$

$x = \frac{255}{5}$

$x = 51$

$1\frac{2}{\cancel{3}} \times \cancel{51}^{17}$

$= 2 \times 17$

$= 34$

Hence, the weight of girls is 34kg.

(g) Let Nitin's income be x.

$\frac{5}{8}$ of $x = ₹5000$

$\frac{5 \times x}{8} = ₹5000$

$x = 5000 \div \frac{5}{8}$

$x = \cancel{5000}^{1000} \times \frac{8}{\cancel{5}}$

$x = 1000 \times 8$

$x = 8000$

(h) Let the weight of boy be x

$\frac{3}{4}$ of $x = 33$

$\frac{3}{4} \times x = 33$

$x = 33 \div \frac{3}{4}$

$x = \cancel{33}^{11} \times \frac{4}{\cancel{3}}$

$x = 11 \times 4$

$x = 44$

Hence, the weight of boy is 4kg.

3. (a) 9 times of a number decreaded by 2 is 3.

(b) 3 times a number is equal to 27.

(c) 4 times of a number increased by 7 is 26.

(d) 5 times a number is equal to 2.

(e) A number increased by 3 is equal to 7.

(f) Twice of a number is added to 1 is 7.

(g) 5 is equal to 5 times of a number decreased by 10.

(h) 12 decreased by number is 8

(i) 48 divided by a number is equal to 4.

(j) 3 times of anumber less than 7 equal 8.

4. Let the number be x.

$x - 64 = 1$

$x = 1 + 64, x = 65$

5. Let the number be x.

$15 + \frac{3}{4}x = 45$

$\frac{2x}{3} = 45 - 15$

$\frac{2x}{3} = 30, 2x = 30 \times 3$

$2x = 90$

$x = \frac{90}{2}, x = 45$

6. Let the number be x

$24 - x = 81$

$-x = 81 - 24$

$-x = 57$

$x = -57$

7. $13 \times x = 182$

$x = \frac{182}{13}$

$x = 14$

8. Let the number be x

$\frac{2x}{7} = 12$

$2x = 12 \times 7$

$2x = 84$

$x = \frac{84}{2}$

$x = 42$

9. Let the cost of 1 pen be x

Cost of 5 pens = 5x

$\therefore (5x = (2 \times 45) - 30$

$5x = 90 - 30$

$5x = 60$

$x = \frac{60}{5}$

$x = 12$

Thus, Cost of 1 pen is ₹12

10. Let the Number be x

Thrice of a number = $3 \times x = 3x$

$3x - 10 = 35$

$3x = 35 + 10$

$3x = 45$

$x = \frac{45}{3}$

$x = 15$

11. Let the first even number be x

Conscutive even numbers = (x), (x + 2)

$\therefore x + x + 2 + x + 4 = 36$

$3x + 6 = 36$

$3x = 36 - 6$

$3x = 30$

$x = 30/3$

$x = 10$

Hence, number is 10.

12. Let the rupees with Amit be x.

Ramit's rupees = 3x

$x + 3x = 20$

$4x = 200$

$x = \frac{200}{4}$

$x = 50$

$3x = 50 \times 3 = 150$

Ramit has ₹ 150.

13. Let the Number be x.

$6x - 8 = 40$

$6x = 40 + 8$

$6x = 48$

$x = \frac{48}{6}$

$x = 8$

Hence, the number is 8.

14. Let the numbers be x &y Respectively

$x + y = 103$

$x = 103\ y$

$x - y = 31$

$103 - y - y = 31$

$-y = 31 - 103$

$-2y = -72$

$y = \frac{-72}{-2}$

$y = 36$

$x = 103 - y$

$x = 103 - 36$

$x = 7$

Hence, the numbers are 67 and 36 respectively

Review Exercise

1. (a) $2 \times \square = 38$

$\square = \frac{38}{2}$

$\square = 19$

(b) $\square + 5 = 9$

$\square = 9 - 5$

$\square = 4$

(c) $\square^2 = 81$

$\square = 9$

(d) $\square + \frac{3}{7} = 1\frac{3}{7}$

$\square = \frac{10}{7} - \frac{-3}{7}$

$\square = \frac{10 - 3}{7}$

$\square = \frac{7}{7}$

$\square = 1$

(e) $\square + \frac{1}{4} = 1\frac{2}{4}$

$\square = \frac{6}{4} - \frac{1}{4}$

$\square = \frac{6-1}{7}$

$\square = \frac{5}{4}$

(f) $\frac{4}{7} \times \square = 8$

$\square = 8 \times \frac{7}{4}$

$\square = \frac{56}{4}$

$\square = 14$

2. (a) $4x + 7 = 47$

$4x = 47 - 7$

$4x = 40$

$x = \frac{40}{4}$

$x = 10$

(b) $x + \frac{5}{7}x = 48$

$\frac{x}{1} + \frac{5x}{7} = 48$

$\frac{7x + 5x}{7} = 48$

$\frac{12x}{7} = 48$

$12x = 48 \times 7$

$12x = 336$

$x = \frac{336}{12}$

$x = 28$

(c) $8 + x = 17$

$x = 17 - 8$

$x = 9$

(d) $2x = 10$

$x = \frac{10}{2}$

$x = 5$

(e) $8 - x = 17$

$-x = 17 - 8$

$-x = 9$

$x = -9$

(f) $x - 3 = -20$

$x = -20 + 3$

$x = -17$

(g) $7x - 4 = 59$

$7x = 59 + 4$

$7x = 63$

$x = \frac{63}{7}$

$x = 9$

(h) $x^2 - 36 = 0$

$x^2 = 36$

$x = 6$

(i) $\frac{x+1}{5} - 3 = 27$

$\frac{x+1}{5} = 30$

$x + 1 = 30 \times 5$

$x + 1 = 150$

$x = 150 - 1$

$x = 149$

(j) $x + 1 = -6$

$x = -6 - 1$

$x = -7$

3. (a) $5x = 10$

Let x be 2

$5 \times 2 = 10$

$10 = 10$

Hence, 2 is the root of the given equation.

Let x be -2

$5 \times (-2) = 10$

$-10 \neq 10$

Hence, -2 is not of the given equation

(b) $x - 5 = 0$

Let x be -5

$-5 - 5 = 0$

$-10 \neq 0$

Hence, -5 is not of the given equation

Let x be 5

$5 - 5 = 0$

$0 = 0$

Hence, 5 not of the given equation.

(c) $x^2 + 4 = 53$

Let x be 4

$(7)^2 + 4 = 53$

$49 + 4 = 53$

$53 = 53$

Let x be –7

$(–7)2 + 4 = 53$

$49 + 4 = 53$

$53 = 53$

Hence, 7 and –7 both are is the root of the given equation.

(d) $x^3 – 8 = 0$

Let x be 2

$(2)3 – 8 = 0$

$8 – 8 = 0$

Let x be –2

$(–2)3 – 8 = 0$

$–8 –8 = 0$

$–16 \neq 0$

Hence, –2 is not is the root of the given equation.

4. (a) Let the number be x

Quarter of x = $\frac{1}{4}$ of x

$= \frac{x}{4}$

$x + \frac{x}{4} = 250$

$\frac{x}{1} + \frac{x}{4} = 250$

$\frac{4x + x}{4} = 250$

$5x = 250 \times 4$

$5x = 1000$

$x = \frac{1000}{5}$

$x = 200$

Hence, the number is 200.

(b) Let the number be x

Five times the number = $5 \times x$

$= 5x$

$\frac{5x}{15} = 45$

$5x = 45 \times 15$

$5x = 675$

$x = \frac{675}{5}$

$x = 135$

Hence, the number is 135

5. (a) $\frac{7 – 8x}{5} = 3$

$7 – 8x = 3 \times 5$

$–8x = 15 – 7$

$–8x = 8$

$x = \frac{–8}{1}$

(b) $x – 1 = 4\ x = 4 + 1$

$x = 5$

(c) $y + 10 = 30$

$y = 30 – 10$

$y = 20$

(d) $4(y–3) = –1$

$4y –12 = –1$

$4y = –1 + 12$

$4y – 11$

$y = \frac{11}{4}$

(e) $y –20 = 30$

$y = –30 + 20$

$y = –10$

(f) $p + 7 = 6$

$p = 6 – 7$

$p = –1$

(g) $p + 37 = –2$

$p = –2 – 37$

$p = –39$

(h) $(x – 1) + (2x) = 8$

$x – 1 + 2\ x = 8$

$3x = 8 + 1$

$3x = 9,\ x = \frac{9}{3} = 3$

(i) $x –17 = –20$

$x = –20 + 17$

$x = –3$

(j) $y - 10 = -5$

$y = -5 + 10$

$y = 5$

(k) $p + 20 = -21$

$p = -21 \quad 20$

$p = -41$

(l) $\frac{x-4}{7} = x$

$x - 4 = x \times 7$

$x - 4 = 7x$

$x - 7x = 4$

$-6x = 4$

$x = \frac{4}{-6}, x = \frac{-2}{3}$

6. Let the first number be x

Number are consecutive, so the other number are , $x + 1$ $(x+ 1 + 1) = x + 2$

$(x + 2) = 52$

$x + 2x + 2 + x + 2 = 52$

$4x + 4 = 52$

$4x = 52 - 4$

$4x = 48$

$x = \frac{48}{4}$

$x = 12$

$x + 1 = 12 + 1 = 13, x + 2 = 12 + 2$

$= 14$

Hence, the numbers are 12, 13 & 14.

7. Let the thrid side be x

Two equal sides = 3x, 3x

$x + 3x + 3x = 35$

$7x = 35$

$x = \frac{35}{4}$

$x = 5$

$3x = 5 \times 3$

$= 15$

Hence, the 3 sides are of length 15cm, 15cm 5cm respectively

8. All sides of square are equal so, $5x - 5 = 4x + 2$

$5x - 4x = 2 + 5$

$x = 7$

9. Let the first number be x

Number are consecutive odd numbers

$= (x + 2), (x + 2 + 2), (x + 2 + 2 + 2), (x + 2 + 2 + 2 + 2 + 2)$

$= x + 2, x + 4, x + 6, x + 8$

$x + x + 2 + x + 4 + x + 6 + x + 8 = 125$

$5x + 20 = 125$

$5x = 120 - 20$

$5x = 105$

$x = \frac{105}{5}$

$x = 21$

$x+ 2 = 21 + 2 , x+ 4 = 21 + 4$

$= 23 \qquad = 25$

$x + 6 = 21 + 6, x + 4 = 21 + 8$

$= 27 \qquad = 29$

Hence the numbers are 21, 23, 25, 27 & 29

10. Dividend = Divisor × Quotient + Remainder

Divided = $13 \times -18 + 7$

Dividend = $-234 + 7$

Dividend = -227

Hence, the number is -227

11. Let the number of years, Priya was 3 times as old as Anu be x.

Therefore

Anu's age = $12 - x$ According to Question

Priya's age = $24 - x$ $(24 - x) = 12 - x$

$(24 - x) = 3(12 - x)$

$24 - x = 36 - 3x$

$24 - 36 = 3x + x$

$-12 = -2x$

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

$x = 6$

Hence, 6 years age, priya was 3 times as old as Anu

Multiple Choice Questions

1. $x + 3 = 10$

$x = 10 - 3$

$x = 7$

$6x - 42$

$= 6(7) - 42$

$42 - 42$

$= 0$

(c) 0

2. $3p + 5 = 26$

$3p = 26 - 5$

$3p = 21$

$p = \frac{21}{3}$

$p = 7$

(d) 7

3. $3(a + 1) = 2a + 7$

$3a + 3 = 2a + 7$

$3a - 2a = =7 - 3$

$a = 4$

(b) $a = 4$

4. $9x + q = 0$

$px = -q$

$x = \frac{-q}{9}$

(c) $\frac{-q}{9}$

5. $\frac{1}{3}(2p + 9) = 7$

$2p + q = 7 \div \frac{1}{3}$

$2p + 9 = 7 \times 3$

$2p = 21 - 9$

$2p = 12$

$p = \frac{12}{2}$

$p = 6$

(b) 6

6. (a) $9x + 23 = 5$

$9x - 5 + 23 = 5$

$-45 + 23 = 5$

$-22 \neq 5$

(b) $7x - 17 = -10$

$7 \times (-5) - 17 = -10$

$-35 - 17 = -10$

$-52 \neq 10$

(c) $\frac{x}{9} - 4 = 0$

$\frac{-5}{9} \frac{-4}{1} = 0$

$\frac{-5\ -36}{9} = 0$

$\frac{-41}{9} \neq 0$

(d) $8x + 23 = 3x - 2$

$(8 \times 5) + 23 = (3x - 5) - 2$

$-40 + 23 = -15 - 2$

$-17\ x + = 17$

(d) $8x + 26 = 3x - 2$

7. $3(x - 4) = 48$

$3x - 12 - 48$

$3x = 48 + 12$

$3x = 60$

$x = \frac{60}{3}$

$x = 20$

$5x2 = 5 \times (20)^2$

$= 5 \times 400$

$= 2000$

(a) 2000

8. Let the number of boys be x

Number of girls = $\frac{1}{5}$ of number of boys

$= \frac{x}{5}$

$x + \frac{x}{5} = 30$

$\frac{x}{1} + \frac{x}{5} = 30$

$\frac{5x + x}{5} = 30$

$6x = 30 \times 5$

$6x = 150$

$x = \frac{150}{6}$

$x = 25$

(c) 25

9. $\frac{y}{-2} = 1$

$y = 1 \times -2$

$y = -25\ (-2) + 4 + 2\ (-2) - 7$

$-10 + 4 + (-4) - 7$

$= -17$

(d) -17

10. All sides of a square are equal

$16x - 19 = 77 - 8x$

$16x + 8x = 77 + 19$

$24\ x = 96$

$x = \frac{96}{24}$

$x = 4$

(c) 4 units

Check your Progress

1. $1 \square + 1\circ = 7\circ$

$1 \square = 7\circ - 1\circ$

$1 \square = 6\circ$

$\square$ = ○○○ ○○○

2. $2\square + 1\circ = 9\circ$

$2 \square = 9\circ - 1\circ$

$2 \square = 8\circ$

$\square\square$ = ○○○○ ○○○○

3. $1 \square + 2\circ = 5\circ$

$1 \square = 5\circ - 2\circ$

$1 \square = 3\circ$

$\square$ = ○○○

4. $x + 4\circ = 2x + 1\circ$

$x - 2x = 1\circ - 4\circ$

$x = -3\circ$

$x = 3\circ$

x = ○○○

5. $2x - 1 = x + 5$

$2x - x = 5 + 1$

$x = 6$

6. $4x + 3 = 5x + 17$

$4x - 5x = 17 - 3$

$x = 14$

7. $-2a - 4 = -4a + 8$

$-2a + 4a = 8 + 4$

$2a = 12$

$a = \frac{12}{2}$

$a = 6$

5 Lines and Angles

Exercise 5.1

1. (a) 75° + 105° –180°: Supplementry angles

(b) 105° = 105° (Equal angles)

(c) 7° + 173° = 180°: Supplementary angles

(d) 25° + 65° = 90°: Complementary agles

(e) 40° + 50° = 90°: Complementry angles

(f) 95° +85° = 180°: Supplementary angles

2. (a) $\angle 1 + 50° = 90°$

$\angle 1 = 90° - 50°$

$\angle 1 = 35°$

(b) $\angle 1 + 50° = 90°$

$\angle 1 = 90° - 50°$

$\angle 1 = 40°$

(c) $\angle 1 + 20° = 90°$

$\angle 1 = 90° - 20°$

$\angle 1 = 70°$

(d) $\angle 1 + 46° = 90°$

$\angle 1 = 90° - 46°$

$\angle 1 = 44°$

(e) $\angle 1 + 57° = 90°$

$\angle 1 = 90° - 57°$

$\angle 1 = 33°$

(f) $\angle 1 + 32° = 90°$

$\angle 1 = 90° - 32°$

$\angle 1 = 58°$

(g) $\angle 1 + 18° = 90°$

$\angle 1 = 90° - 18°$

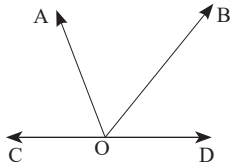
$\angle 1 = 72°$

(h) $\angle 1 + 6° = 90°$

$\angle 1 = 90° - 6°$

$\angle 1 = 84°$

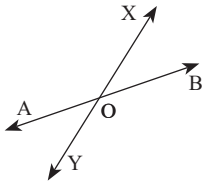
3. (a)



Adjacent angles: $\angle AOC$ and $\angle AOB$

: $\angle AOB$ and $\angle BOD$

(b)



Adjacent angles: $\angle AOX$ and $\angle XOB$

: $\angle XOB$ and $\angle BOY$

4. (a) $X° + 120° = 180°$ (Linear pair)

$x = 180° - 120$

$x = 60°$

(b) $x + 20° + x° = 180°$ (Linear pair)

$20° + 2x = 180°$

$2x = 160°$

$x = \left(\frac{160}{2}\right)°$

$x = 80°$

(c) $y = 65°$ (Vertically opposite angles)

(d) $m° + (m + 20°) = 180°$ (Linear pair)

$2m + 180° - 20°$

$2m = 160°$

$m = \left(\frac{160}{2}\right)°$

$m = 80°$

(e) $y° + 2y° = 180°$

$3y° = 180° - 20°$

$y = \frac{180}{3}°$

$y = 60°$

5. (a) $\angle 1 + 70° = 180°$

$\angle 1 = 180° - 70°$

$\angle 1 = 110°$

(b) $\angle 1 + 20° = 180°$

$\angle 1 = 180° - 20°$

$\angle 1 = 160°$

(c) $\angle 1 + 135° = 180°$

$\angle 1 = 180° - 135°$

$\angle = 45°$

(d) $\angle 1 + 132° = 180°$

$\angle 1 = 180° - 132°$

$\angle 1 = 48°$

(e) $\angle 1 + 20° = 180°$

$\angle 1 = 180° - 70°$

$\angle 1 = 110°$

(f) $\angle 1 + 115° = 180°$

$\angle 1 = 180° - 115°$

$\angle 1 = 65°$

(g) $\angle 1 + 40° = 180°$

$\angle 1 = 180° - 40°$

$\angle 1 = 140°$

(h) $\angle 1 + 50° = 180°$

$\angle 1 = 180° - 50°$

$\angle 1 = 130°$

Exercise 5.2

1. (a) $\angle BOX$

(b) $\angle OPD$

(c) $\angle DPY$

(d) $\angle BOP$

(e) $\angle YPC$

(f) $\angle AOP$

(g) $\angle AOX$

(h) $\angle OPY$

(i) $\angle AOP$

2. $\angle 2 = 180° - 62°$

$\angle 2 = 118°$

If $\angle 1 + \angle 2 = 180$, Then l 11m, as if the sum of two interior angles on the same side of transversal is supplementry, then the two lines are parallel to each others

$\angle 1 + \angle 2 = 118° + 62°$

$= 180°$

Hence, l 11m.

3. (a) $\angle x = 105°$ (Corresponding angles)

(b) $\angle x = 103°$ (Atternate agles)

(c) $\angle 2 + 90° = 780°$ (Linear pair)

$\angle 2 = 90°$

$\angle x = 90°$ (Alternate angles to $\angle 2$)

(d) $56° + \angle 8 = 180°$ (Linear pair)

$\angle 8 = 180° - 56°$

$\angle 8 = 124°$

$\angle x = 124°$ (Corresponding angles)

4. Given l 11m, $\angle 1 = 65°$

$\angle 1 = \angle 3$ (Vertically opposite angles)

$\angle 1 = \angle 7$ (Alternative angles)

$\angle 1 = \angle 5$ (Corresponding angles)

$\angle 1 = \angle 5 = \angle 7 = \angle 3 = 65°$

$\angle 1 + \angle 2 = 180°$ (Linear pair)

$65° + \angle 2 = 180°$, $\angle 2 = 115°$

$\angle 2 = \angle 4$ (Veritacally opposite angles)

$\angle 2 = \angle 8$ (Alternate angles)

$\angle 2 = \angle 6$ (Corresponding angles)

$\angle 2 = \angle 6 = \angle 4 = \angle 8 = 115°$

5. $\angle 2 = (3x + 4)°$ (Vertically opposite angles)

$\angle 1 = \angle x$ (Vertically opposite angles)

$\angle 1 + \angle 2 = 180°$ (Sum of interior angles on the same side of a transversal is supplementary)

$3x + 4 + x = 180°$

$4x + 4 = 180°$

$4(x + 1) = 180°$

$\angle 1 = \angle x = 44°$

$\angle 2 = 3x + 4 = 3 \times 44 + 4 = 132° + 4° = 136°$

Review Exercise

1. (a) $\angle 1 + 42 = 90°$

$\angle 1 = 90° - 42°$

$\angle 1 = 48°$

(b) $\angle 1 + 28° = 90°$

$\angle 1 = 90° - 28°$

$\angle 1 = 62°$

(c) $\angle 1 + 32° = 90°$

$\angle 1 = 90° - 61°$

$\angle 1 = 29°$

(d) $\angle 1 + 61° = 90°$

$\angle 1 = 90° - 61°$

$\angle 1 = 29°$

(e) $\angle 1 + 43° = 90°$

$\angle 1 = 90° - 43°$

$\angle 1 = 47°$

(f) $\angle 1 + 48° = 90°$

$\angle 1 = 90° - 48°$

$\angle = 42°$

(g) $\angle 1 + 65° = 90°$

$\angle 1 = 90° - 65°$

$\angle = 25°$

(h) $\angle 1 + 43° = 90°$

$\angle 1 = 90° - 43°$

$\angle = 47°$

(i) $\angle 1 + 2° = 90°$

$\angle 1 = 90° - 2°$

$\angle 1 = 88°$

(j) $\angle 1 + 10° = 90°$

$\angle 1 = 90° - 10°$

$\angle 1 = 80°$

2. (a) $\angle 1 + 65 = 180°$

$\angle 1 = 180° - 65°$

$\angle 1 = 115°$

(b) $\angle 1 + 152° = 180°$

$\angle 1 = 180° - 152°$

$\angle 1 = 28°$

(c) $\angle 1 + 135° = 180$

$\angle 1 = 180° - 135°$

$\angle 1 = 45°$

(d) $\angle 1 + 115° = 180°$

$\angle 1 = 180° - 115$

$\angle 1 = 65°$

(e) $\angle 1 + 117° + 180°$

$\angle 1 = 180° - 117°$

$\angle 1 = 63°$

(f) $\angle 1 + 133° = 180°$

$\angle 1 = 180° - 133°$

$\angle 1 = 47°$

(g) $\angle 1 + 103° = 180°$

$\angle 1 = 180° - 103°$

$\angle 1 = 77°$

(h) $\angle 1 + 78° = 180°$

$\angle 1 = 180° - 78°$

$\angle 1 = 102°$

(i) $\angle 1 + 150° = 180°$

$\angle 1 = 180° - 150°$

$\angle 1 = 30°$

(j) $\angle 1 + 51° = 180°$

$\angle 1 = 180° - 51°$

$\angle 1 = 129°$

3. (a) $\angle 1 = \angle 2$, $\angle 2 = \angle 3$

(b) $\angle 3 = \angle 4$, $\angle 1 = \angle 2$, $\angle 2 = \angle 3$, $\angle 4 = \angle 1$

(c) $\angle 1$ and $\angle 2$; $\angle 2$ and $\angle 3$; $\angle 3$ and $\angle 4$; $\angle 4$ and $\angle 5$; $\angle 5$ and $\angle 6$; $\angle 6$ and $\angle 1$

4. (a) $\angle zox = 180° - 57°$

$\angle zox = 180° - 57°$

$\angle zox = 123°$

(b) $\angle zox = 89°$ (Vertically oppsite angle to $\angle woy$)

$\angle woy + \angle zoy = 180°$ (Linear pair)

$89° + \angle zoy = 180°$

$\angle zoy = 180° - 89°$, $\angle zoy = 91°$

$\angle wox = 91°$ (Verically oppsite angle to $\angle woy$)

(c) $\angle wox = \angle zoy$ (Vertically oppsite angle)

$\angle 04 = 32°$

$\angle woy + \angle wox = 180°$ (Linear pair)

$\angle woy° + 32° = 180°$

$\angle woy = 180° - 32°$

$\angle woy = 148°$, $\angle Woy = \angle xoz = 148°$ (Linear pair)

5. (a) $\angle x + 75° = 180°$ (Linear pair)

$\angle x = 180° - 75°$

$\angle x = 105°$

(b) $x + 2x + 25° = 180°$

$3x + 25° = 180°$

$3x = 180° - 125°$

$3x = 155°$

$x = \frac{155}{3}$

$= 51.66$

(c) $x + \frac{x}{3} + \frac{x}{3} + 40 = 360°$

$\frac{x}{1} + \frac{2x}{3} = 320°$

$\frac{3x + 2x}{3} = 320°$

$5x = 320° \times 3$

$5x = 960,\ x = \frac{960°}{5},\ x = 192°$

$\frac{x}{3} = \frac{192}{3} = 64°$

$\frac{x}{3} + 40° = 64° + 40° = 104°$

(d) $x - 75° + x = 180°$

$2x = 180° + 75°$

$2x = 255$

$x = \frac{255°}{2}$

$x = 127.5°$

(e) $\angle x = 55°$ (Vertically opposite angle)

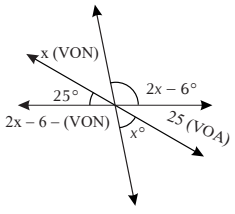
(f) $3x + (7x - 2 + y) = 180°$ (Linear pari)

$10x + y = 180 + 2$

$10x = 182 - y$

$x = \frac{182 - y}{10}$

(g)



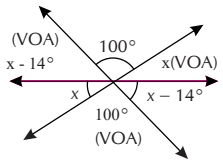
Sum of all the agnles = 360°

$x + 2x - 6 + 25 + x + 2x + x + 2x - 6 + 25 = 360°$

$6x - 12 + 50 = 360 = 6x = 360 - 38°$

$x = \frac{322°}{6} = 53.67°$

(h)



Sum of all the angle = 360°

$100° + x + x - 14 + 100 + x + x - 14° = 360°$

$200 - 28 + 4x = 360° = 4x = 188° = x = \frac{188°}{4}$

$x = 47°$

(i) $x + \frac{x}{3} + \frac{x}{3} = 45 + 2x = 360°$

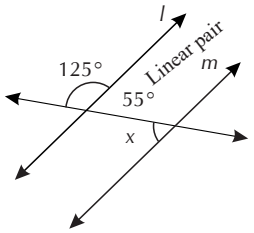
$\frac{3x}{1} + \frac{2x}{3} = 405°$

$= \frac{9x + 2x}{3} = 405°$

$= 11x = 1215°$

$x = \frac{1215°}{11} = 110.45°$

6. (a)



$\angle 2 = 180° - 125°$ (Linear pair)

$\angle 2 = 55$

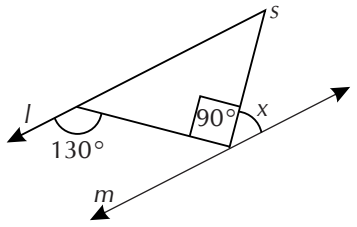
$\angle x = \angle 2 = 55°$ (Alternate angles)

(b) $\angle 2 + 2x = 180°$ (Linear pair)

$\angle 2 = 180° - 2x = \angle 2 = \angle 8$ (Alternate angles)

$x = 132°$

(d)



$\angle 3 = \angle 5$ (Alternate angle)

$90° + x = 130°$

$x = 40$

(e) $\angle 1 = \angle 7$ (Alternate angles)

$x + 56° = 95°$

$x = 95 - 56° = x = 39°$

(f) $\angle 3 + \angle 8 = 180°$ (Interior angles)

$x + x + 25° = 180$

$2x = 180° - 25 = 2x = 155°$

$x = \frac{155}{2} = x = 77.5$

7. **(i)** (a) $\angle 1 = \angle 5$ (Corresponding angles)

$97° \neq \angle 98°$ (Alternate angles)

(Hence, l and m are not parellel lines)

(b) $\angle 2 = \angle 8$ (Alternate angles)

$108° = 108°$

(Hence, v and m are parallel lines)

(c) $\angle 5 = 180° = 108°$ (Linear pair)

$\angle 5 = 72$

$\angle 5 = \angle 3$ (Alternate angles)

$60° \neq 72°$

Hence, l and m are not parallel lines

(d) $\angle 1 = 180° - 140°$ (Linear pair)

$\angle 1 = \angle 7$ (Alternate angles)

$40° = 40°$

Hence, w and m are parallel lines.

(e) $\angle 3 = \angle 7 = 50°$ (Corresponding angles But auording to second line)

$\angle 7 = 75°$ (Alternate angles)

Hence, l and m are not parrallel

(f) $\angle 3 = \angle 5$ (Corresponding angles)

$39° = 39°$

Hence, w and m are parallel lines.

(ii) No, as a and b are not equidistant to each other whereas, parallel lines are equidistant to each other.

Multiple Choice Question

1. (a) equidistant

2. (c) transversal

3. (c) equal

4. (d) Supplementary

5. (b) Total of the interior angles on the same side of tansured is 180°.

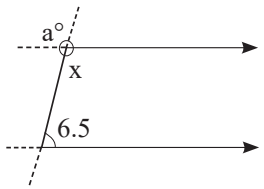
6. (c) 4

7. (d) 4

8. (a) Parrallel

9. (a) Parallel

10.



$x + 64 = 180°$ (interior angles)

$x = 180 - 65$

$x = 115$

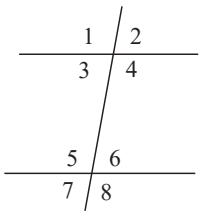
$\angle a + x = 360$ (complete angle)

$\angle a + 115° = 360° = \angle a = 360° - 115°$

$\angle a = 245°$

(c) 245°

11.



(c) vertical angles

12. $\angle 2$ and $\angle 7$

13. Let assume angle A and its supplement angle as B.

Then, $A + B = 180°$

Since, angle A is one-fifth of angle B

Therefore, $A = B/5$

WKT,

$A + B = 180°$

By susbstituting $A = B/5$ we get,

$= B/5 + B = 180°$

$= 6B/5 = 180°$

$= B = (180° \times 5)/6$

$= B = 30° \times 5$

$= B = 150°$

Now, calculate the value of angle A by using A = B/5

A = 150°/5

= A = 30°

(a) 30

Check your progress

1. (a) ∠r

(b) ∠g

2. (a) ∠c

(b) ∠d

3. Yes

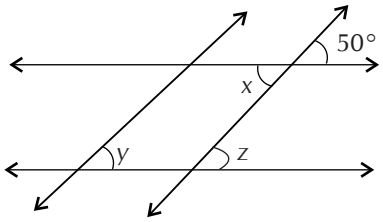
4. Yes

5. The perpendicular distance between two parallel lines is equal everywhere.

6. ∠m = 85° (Vertically opposite angle)

∠n = 85° (Alternate angles)

7.



∠x = 50°(Vertically opposite angles)

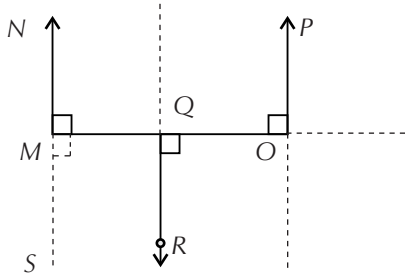
∠x = ∠z = 50° Alternate angles)

∠z = ∠y = 50° (Corresponding angles)

8. ∠a = ∠c, ∠e = ∠f

9. ∠l = ∠h, ∠a = e, ∠c = ∠g and ∠b = ∠f

10.



∠MQR = 180° – 90° = 90° (Linear pair)

∠OQR = ∠SMQ (Corresponding angles)

Hence MN || OP || QR

Challenge

Given, c = 57°

c = a + b = 57° (Alternating Opposite angle)

$= \frac{c}{3} = a = c = 3a = 57° = 3a = a \frac{57°}{3} = 19$

Putting this in

3a = a + b = b = 2a = 2 × 19 = 38

Now, b + d = 180° (Adjacent Angles are Supplementry)

= d = 180° – 38°

= 142°

6 The Triangle and its properties

Exercise 6.1

1. (a) $\angle A + \angle B + \angle C = 50° + 60° + 70° = 180°$

Therefore, they can make a triangle as sum of interior angles of a triangle is 180°

(b) $\angle P + \angle Q + \angle R = 85 + 80 + 70 = 235$, $235 \neq 180$

Therefore, they cannot make a triangle as sum of interior of a triangle is 180°.

(c) $\angle x + \angle y + \angle z = 20° + 60° + 55° = 135°$

$135 \neq 180°$

Therefore, they cannot make a triangle as sum of interior angles of a triangle is 180°.

2. (a) $\angle A + \angle B + \angle C = 180°$

$\angle A + 90° + 40° = 180°$

$\angle A = 180° - 130°$

$\angle A = 50°$

(b) $\angle A + B + \angle C = 180°$

(c) $\angle B = 180 - 120°$ Linear pair

$\angle A + \angle B + \angle C = 180°$

$\angle A + 60° + 70° = 180°$

(d) $\angle P + \angle Q + \angle R = 180°$

$\angle P + 69° + 80° = 180°$

$\angle P = 180° - 149°$

$\angle P = 31°$

(e) $\angle Y = 180° - 130°$ (Linear pair)

$= 50$

$\angle X + \angle Y + \angle Z = 180° = 58° + 50 + \angle Z = 180°$

$\angle Z = 180° - 108°$

$\angle Z = 72°$

(f) $\angle Y = 70°$ (Alternative angles)

$\angle B + \angle X + \angle Y = 180°$

$60° + \angle X + 70° = 180°$

$\angle X = 180° - 130°$

$\angle X = 50°$

Challenge

In ΔABC

$\angle A + \angle B + C = 180°$

$\angle A + 70° + 30° = 180°$

$\angle A = 80°$

We know that, $\angle DAC$ bisects $\angle A$

$\angle \Delta DAC = \frac{1}{2} \angle \Delta$, $\angle DAC = 80°/2$

$\angle DAC = 40°$

In ΔADC

$\angle ADC + \angle DCA + \angle DAC = 180°$

$\angle ADC + 30° + 40° = 180°$

$\angle ADC = 110°$

We know that exterior angles is equal to the sum of 2 interior Opposite angles Therefore,

$\angle ADC = \angle APD + \angle PAD$

$110 = 90° + \angle PAD$

$\angle PAD = 20°$

Hence, $\angle PAD = 20°$

Exercise 6.2

1. (a) $(AC)^2 = (AB2 + (BC)^2$ Using Pythagoras theorm

$= (AC)^2 = (15)^2 + (15)^2$

$= AC^2 = (15)^2 + (15)^2$

$AC^2 = 225 + 250$

$AC^2 = 450$

$AC = \sqrt{450}$ or $15\sqrt{2}$

(b) $(xz)^2 = (x4)^2 + (4z)^2$ (x)

$(3)^2 = (x4)^2 + (\frac{5}{2})^2$

$\frac{9}{1} - \frac{25}{4} = (xy)^2$

$\frac{36 - 25}{4} = (xy)^2$

$(xy)^2 = \frac{11}{4}$

$x4 = \frac{\sqrt{11}}{2}$cm

2. (a) $x^2 = (AB)^2 + (BC)^3$ (11)

$x^2 = (12)^2 + (9)^2$

$x^2 = 144 + 81$

$x^2 = 225$

(b) $(AC)^2 = (AB)^2 + x^2$

$(11)^2 = (9)^2 + x^2$

$x^2 = 121 - 81$

$x^2 = 40$

$x = 2\sqrt{10}$ cm

(c) $(AC)^2 = (AB)^2 + (BC)^2$

$(25)^2 = (24)^2 + (x)^2$

$625 = 576 + x^2$

$x^2 = 625 - 576$

$x^2 = 49$

$x = 7$cm

(d) $(AC)^2 = (AB)^2 + (BC)^2$

$(26)^2 = x^2 + (24)^2$

$676 = x^2 + 576$

$x^2 = 676 - 576$

$x^2 = 100$

$x = 10$

3. Only (a) as (Sum of any 2 sides of a triangle should be greater than the third side)

4. (a) $(c)^2 = a^2 + b^2$

$(c)^2 = (6)^2 + (8)^2$

$(c)^2 = 36 + 64$

$(c)^2 = 100$ $c = 10$

(b) $(c)^2 = (a)^2 + (b)^2$

$169 - 25 = b^2$

$b^2 = 144$

$b = 12$

(c) $c^2 = a^2 + b^2$

$(25)^2 = a^2 + (24)^2$

$625 - 576 = a2$

$a^2 = 49$

$a = 7$

(d) $c^2 = a^2 + b^2$

$c^2 = (10)^2 + (29)^2$

$c^2 = 100 + 576$

$c^2 = 676$

$c = 26$

(e) $c^2 = a^2 + b^2$

$c^2 = (16)^2 + (30)^2$

$c^2 = 256 + 900$

$c^2 = 1156$

$c = 34$

(f) $c^2 = b^2 + e^2$

$(5)^2 = (3)^2 + a^2$

$25 = 9 + a^2$

$a^2 = 25 - 9$

$a^2 = 16 - a = 4$

(g) $c^2 = a^2 + b^2$

$(41)^2 = (40)^2 + b^2$

$1681 = 1600 - b^2$

$b^2 = 81$

$b = 9$

(h) $c^2 = a^2 + b^2$

$(17)^2 = a^2 + (15)^2$

$289 = a^2 + 225$

$a^2 = 289 - 225$

$a^2 = 64$

$a = 8$

5. To form a right – angled triangle be

(a) $(13)^2 = (5)^2 + (12)^2$

$169 = 25 + 144$

$169 = 169$

Hence, it can form a Δ.

(b) $(8)^2 = (6)^2 + (5)^2$

$64 = 36 + 25$

$64 = 51$

(c) $(a)^2 = (7)^2 + (8)^2$

$81 = 49 + 64$

$81 \neq 113$

Hence, it cannot form a Δ.

(d) $(17)2 = (8)2 + (15)2$

$289 = 64 + 225$

$289 = 289$

Hence, it can form a Δ.

(e) $(26)^2 = (10)^2 + (24)^2$

$676 = 100 + 576$

$676 = 676$

Hence, it can form a Δ.

(f) $(18)^2 = (11)^2 + (14)^2$

$324 = 121 + 196$

$324 \neq 317$

6. Let AC be the ladder and AB be the wall.

$(AC)^2 = (AB)^2 + (BC)^2$

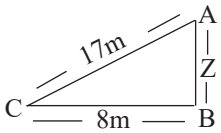
$(17)^2 = (8)^2 + (BC)^2$

$289 = 64 + (BC)^2$

$289 - 64 = (BC)^2$

$(BC)^2 = 225$

$BC = 15cm$



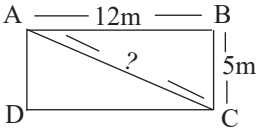
Hence, the height of the window from the ground is 15m.

7. $(AC)^2 = (AB)^2 + (BC)^2$

$(AC)^2 = (125)^2 + (5)^2$

$(AC)^2 = 144 + 25$

$(AC)^2 = 169$, $AC = 13m$



Hence, the length of the diagnol AC is 13m.

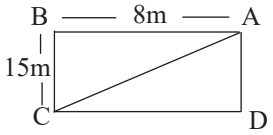
8. Let AB and BC be the distance travelled by Ramesh and be the distance travelled by lovely.

Here, $(AC)^2 = (AB)^2 + (BC)^2$, $(AC)^2 = (8)^2 + (15)^2$

$(AC)^2 = 64 + 225$

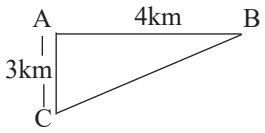
$(AC)^2 = 289$

$AC = 17m$



Hence, distance traveled by lucky is 17m.

9. Let AC and AB be the distance travelled by Ajay



$(BC)^2 = (AB)^2 + (AC)^2 = (BC)^2 = (4)^2 + (3)^2$

$= (BC)^2 = 16 + 9$

$(BC)^2 = 25 = BC = 15km$

Hence, the distance between the starting point and the terminatity point is 5 km.

10. In figure ABCD

Draw DE || to CB

$AE = AB - DC$

$= (36 - 28)m$

$= 8m$

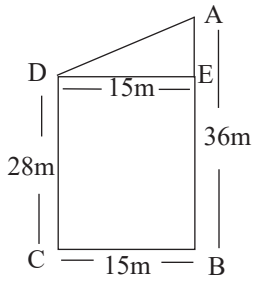
$(AD)^2 = (AE)^2 + (DE)^2$

$(AD)^2 = (15)^2 + (8)^2$

$(AD)^2 = 225 + 64$

$AD^2 = 289$

$AD = 17m$



Hence, the distance between the tops of the towers is 17m.

Review Exercise

1. (a) $\angle A + \angle B + C = 180°$ (Sum of angles of the Δ is 180°)

$= 5° + 170° + 15° = 180°$

$180 = 180°$

Hence ABC is a Δ

(b) $\angle A + \angle B + C = 180°$ (Sum of angles of the Δ is 180°)

$80° + 80° + 80° = 180$

$240° \neq 180°$

Hence, ABC is not a Δ

(c) $\angle A + \angle B + C = 180°$ (Sum of angles of the Δ is 180°)

$100° + 70° + 30° = 180°$

$200° = 180°$

$100° + 70° + 30° = 180$

$200° \neq 180°$

Hence, ABC is not a Δ

2. (a), (b), (c) and (d) as (sum of any 2 sides of a triangle should be greater than the third side)

3. AB = AC (Isoscles Δ)

Let the length of AB and c be x cm

$(AC)^2 = 98$ (Given)

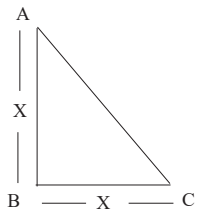
$(AC)^2 = (AB)^2 + (BC)^2$ (Pythagoras theorem)

$98 = x^2 + x^2$

$98 = 2x^2$

$x^2 = 98/2$

$x^2 = 48$, $x = 7$

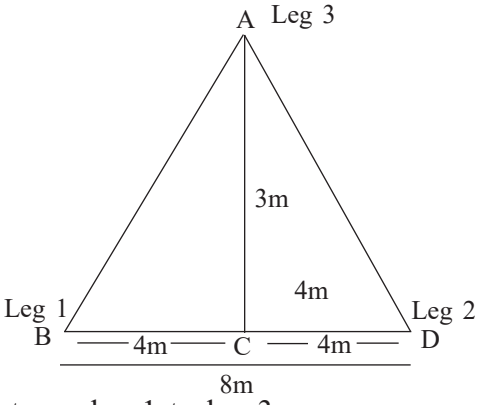


Length of AB and AC = 7cm

Length of AC = $\sqrt{98}$ cm

4. Distance from two ends are same from leg 3

Hence, BC = CD = $\frac{8}{2}$ = 4m



Distance leg 1 to leg 3

$(AB)^2 = (AC)^2 + (BC)2$

$(AB)^2 = (C)^2 + (4)^2$, $(AB)^2 = 9 + 16$, $(AB)^2 = 25$

AB = 5m

Hence, the distance from leg 1 to leg 3 is 5m.

5. If a triangle is a right angled triangle then $(H)^2 = (P)^2 + (B)^2$

(a) $(15)^2 = (8)^2 + (7)^2$

$225 = 64 + 49$

$225 \neq 113$

It is not a right angle triangle

(b) $(8)^2 = (4)^2 + (6)^2$

$64 = 16 + 36$

$64 \neq 52$

It is not a right angle triangle

(c) $(10)^2 = (6)^2 + (B)^2$

$100 = 36 + 64$

$100 = 100$

It is a right angles triangle.

(d) $(5)^2 = (3)^2 + (4)^2$

$25 = 9 + 16$

$25 = 25$

It is a right angle Δ.

(e) $(61)^2 = (60)^2 + (9)^2$

$3721 = 3600 + 81$

$3721 \neq 3681$

It is a right angled Δ it is not a Δ.

6. Let AB be the length of the building and BC be the distance between rope and building's ground.

$(AC)^2 = (AB)^2 + (BC)^2$

$(AC)^2 = (8)^2 + (6)^2$

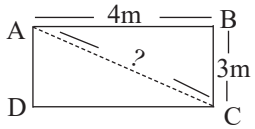
$(AC)^2 = 64 + 36$

$(AC)^2 = 100$

AC = 10m

Hence, the minimum length of AC is 10m.

7.



Let the rectanguar room be ABCD. Largest metallic rode can be the length of the diagnol of the room. Therefore, $(AC)^2 = (AB)^2 + (BC)^2$ $(AC)^2 = (4)^2 + (3)^2 = (AC)^2 = 16 + 9$, $(AC)^2 = 25$, AC = 5m

Hence, the length of the largest matallicrod can be of 5m.

Multiple Choice Question

1. (c) 180°

2. (b) greater than the third side.

3. (a) ∠P

4. (b) Supplementary angles

5. (d) $a^2 + b^1 = c^2$

6. (c) greater than each one of its interior opposite angles is greater than the third side.

7. (b) Yes, as sum of any 2 sides is greater than the third side.

8. Sum of angles of a triangle = 180°

$60° + 40° + \angle x = 180$

$\angle x = 80°$

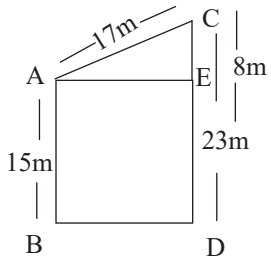
(d) 80°

9. (b) AB as $(P)^2 + (B)^2 = (H)^2$

10. (b) 60° as 60° + 60° + 60° = 180°

Sum of angles of a triangle = 180

11.



$\angle E = AD - AB$

$\angle E = (23 - 15)m$, $\angle E = 8m$

$(AC)^2 = (CE)^2 + (AE)^2$ (By Pythagoras thorem)

$(17)^2 = (8)^2 + (AE)^2$

$289 - 64 = (AE)^2$

$(AE)^2 = 225$, AE = 15m

(b) 15m

12. $P° + 70° + \underbrace{180° - 119°}_{\text{Linear pair}} = 180°$

$P° + 70° + 61° = 180°$

$P° = 180° - 131°$

$P = 49°$

(b) 49°

13. $54 + 70° + (3x - 4)° = 180°$

$3x = 180° - 120°$

$3x = 60$

$x = 20°$

(c) 20°

14. If all the sides are equal hence, their angles are also equal, that is equal to 60°

Hence ABC = ABD + CBD

ABC = 60° + 60°

ABC = 120°

(a) 120°

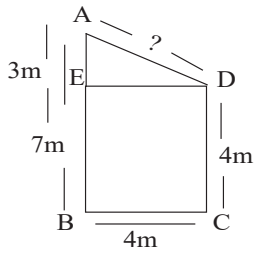
15. AE = AB – CD

AE = 7m – 4m

AE = 3m

ED = BC

$(AD)^2 = (AE)^2 + (ED)^2$



$(AD)^2 = (3)^2 + (4)^2 = (AD)^2 = 9 + 16$

$(AD)^2 = 25$, AD = 5m

(c) 5m

Check Your Progress

1. One angle = 90°

Other 2 angles = 180° – 90° = 90°

(Sum of angles of a triangle = 180°)

2. No, In an isoseles Δ, the angle will be 90°, 45°, 45°

90° = 45° + 45° = 90° = 90°

3. Let the ratio of the angle be x.

1x + 1x + 1x = 180° (x)

3x = 180°, x = 60°

4. 60° + 70° + ∠x = 180° (Sum of angles of a triangle = 180°) = ∠x = 180° – 130°, ∠x = 50°

5. 10cm

6. No, as (Sum of angles of a triangle = 180°)

7. ∠ACB = 180° – 120° (Linear pair) = 60°

8. Yes, as all three angles can be of 60°

7 Congruence of triangles

Exercise 7.1

1. To be done by Students

2. AB = BA

CD = DC, if AB = CD, BA = DC, that means BA ≅ DC [2 line segments are congruent if they have equal Lengths]

3. To be done by Students

4. (a) PQ, QR and PR are congrunt to each other as tnhey are equal [All sides are equal equilateral Δ]

(b) PQ, QR, RS and SP congrunt to each other as they are equal [All sides are equal a square]

(c) AC and BD, AB and Cd congrunt to each toehr as they are equal [Opp. side are equal in a rectangle]

Exercise 7.2

1. (a) $\overline{AC} = \overline{DE}$ (Given), $\overline{BC} = \overline{EC}$ (Given), $\angle C = \angle E$

Δ ABC ≅ ΔDEFC (By SAS)

(b) $\overline{QR} = \overline{YZ}$ (Given), $\angle R = \angle Z$, $\angle Q$, $\angle Y$

ΔPQR = ΔXYZ (By ASA)

(c) $\overline{MN} = \overline{DF}$ (Given) $\angle F$ (Each 90°).

$\overline{OM}$ = OE Given

ΔMNO ≅ ΔDEF (RHS)

(d) $\overline{PQ}$ = TU Given, $\overline{PQ} = \overline{SU}$ Given, $\overline{QR} = S\overline{T}$ Given

ΔPQR ≅ ΔTV (By SSS)

(e) $\overline{KL} = \overline{AB}$ (Given) $\overline{LM} = \overline{AC}$ (Given) $\angle M = \angle C$ (Given)

ΔKLM = ΔABC (By SAS)

(f) $Z\overline{X} = \overline{QR}$ (Given) $\angle X = \angle Q$ (Given), $\angle Z = \angle R$ (Given)

ΔXYZ ≅ ΔPQR (By ASA)

(g) $\angle V = \angle A$, $\angle W = \angle B$, $\angle V = \angle C$

ΔUVW ≅ ΔCBA (By AAA)

(h) ΔABC is not congruent ot ΔDEF

(i) $A\overline{B} = D\overline{E}$ (each 4cm), $\overline{AC} = \overline{EF}$ (Each 3cm)

(j) $\overline{PQ} = \overline{PR}$ (each 4.8cm)

$\overline{QQ} = \overline{QR}$ (each 32 cm)

$\angle PQQ = \angle PQR$ (each 90°)

ΔPQR ≅ ΔPQR (By RHS)

(k) $\overline{MO} = \overline{OP}$

$\overline{OQ} = \overline{OP}$

$\angle MON = \angle POQ$ (UOA)

ΔMON ≠ ΔPOQ

(By SAS)

2. (a) XY = RP

YZ = PQ

$\angle Y = \angle P$

By SAS ΔXYZ ≅ ΔRPQ

(b) ΔXYZ ≅ ΔPQR

XY = PQ, YZ = QR

$\angle y = \angle Q$

By SAS ΔXYZ ≅ ΔPQR

(c) xy = QP

YZ = PR

$\angle Y = \angle P$

By SAS ΔXYZ ≅ ΔQPR

3. In ΔABD and ΔBCD

AB = CD (Given)

AD = BC (Given)

BD = BDC (Common sides)

Hence, ΔABD ≅ ΔBCD by SAS.

4. (a) In ΔPQM and PRm

PQ = PR (Isoscles triangle)

$\angle MPQ = \angle MPR$ (Bisectors of $\angle P$)

PM = PM (Common)

By SAS, ΔPQM ≅ ΔPRM

(b) ∠PMQ and ∠PMR form a Linear pair, since ΔPQM ≅ ΔPMR, they must be equal and thus each measuring 90°

(c) ΔPMQ ≅ ΔPMR

Thus, QM = MR which make M as the midpoint of QR (By PCT)

5. In ΔKOM and ΔNOL

OK = OL (KL bisect at 0)

OM = ON (MN biscect at 0)

∠KOM = ∠LON (Vertically opposite angles)

ΔKOM ≅ ΔNOL (By SAS)

or ΔKOM ≅ LON (By SAS)

6. In ΔABD and ΔACD

AB = BC (Isoscles triangle)

∠ADB = ∠ADC (each 90°)

AD = AD (Common)

By SAS, ΔABD ≅ ΔACD

Hence, By ∠DCT ∠B = ∠C

7. In ΔPQO ≅ ΔPRO

PQ = QR (Given)

QO = OR (Given)

PO = PO (Common)

By, SSS ΔPQO ≅ ΔPRO

(b) ∠POQ and ∠POQ, they must be equal thus each measuring 90°

Hence ∠QPO = ∠RPO (By (P.C.T.)

(c) ΔPQP = ΔPRO

∠Q = ∠R (BY (P.C.T)

(d) ∠QPO = ∠RPO (By (P.C.T)

8. In ΔXYP and ΔXZP

∠XPY = ∠XPZ (each 90°)

∠YZP = ∠ZXP (XP is the bisector of ∠X)

XP = XP (Common)

By, ASA ≅ ΔXYP ΔXZP

Thus, XY = YX (By P.C.T)

Review Exercise

1. (a) In ΔABC and ΔPQR

AB = PQ (each 5cm)

∠A = ∠P (each 50°)

AC = PR (each 6cm)

By, SAS ΔABC ≅ ΔPQR

(b) In ΔABC and ΔXYZ

AB = XY (each 3cm)

∠C = ∠Z (each 45°)

BC = YZ (each 4cm)

By, SAS ΔABC ≅ ΔXYZ

(c) In ΔXYZ and ΔDEF

∠Y = ∠F (each 45°)

∠Z = ∠E (each 65°)

YZ = FE (Given)

By ASA ΔXYZ ≅ ΔDEP

(d) In ΔABC and ΔDEF

AB = DF (each 6cm)

BC = EF (Given)

∠B = ∠F (each 60°)

ΔABC ≅ ΔDEF (By SAS)

(e) In ΔKLM and ΔQRS

KM = QS (each 11cm)

LM = SR (each 6cm)

∠L = ∠R (each 90°)

ΔKLM ≅ ΔQRS (By RHS)

(f) In ΔABC and ΔDEF

AB = DE (each 7cm)

AC = DF (each 8 cm)

BC = FE (Given)

By, SSS ΔABC ≅ ΔDEF

(g) In ΔKLN and ΔMLN

LN = LN (Common)

KL = MN (each 5cm)

∠KNL = ∠MLN (each 50°)

Hence, ΔKLN ≅ ΔMLN (By SAS)

(h) In ΔABC and ΔADC

∠BAC = ∠CAD (each 30°)

AC = AC (Common)

No, three sides or angles are common hence, ΔABC is not congruent to Δ ACD.

2. In ΔQRP and ΔPSQ

PS = QR (Given)

PQ = PQ (Common)

PR = QS (Given)

By, SSS ΔPSQ ≅ ΔQRP

3. In ΔBAD and ΔBCD

Since, BD biscects ∠B and ∠D

∠ABD = ∠CBD

∠ADC = ∠CDB

BD = BD (Common)

By, ASA ΔBAD ≅ ΔBCD

4. In ΔPQR and ΔTSR

PR = TR (each 3cm)

QR = SR (each 2cm)

∠PRQ = ∠SRT (Vertically opposite angles)

By SAS, ΔPQR ≅ ΔTSR

5. In ΔKLO and ΔKNM

KL = KM (Given)

KN = KN (Common)

By, SSS ΔKLO ≅ ΔKNN

LO = MNC (By C.P.C.T)

6. In ΔPSR and ΔPTQ

PR = PE (Common)

PQ = PQ (Common)

PQ + QS = PR + RT

PS = PT

By, SSS, ΔPSR = ΔPTQ

QT = RS (By C.P.C.T)

7. In ΔABC and ΔDCB

AB = DC (Given)

AC = BD (Given)

BC = BC (Common)

8. In ΔPQR and ΔXYZ

PR = XY (Given)

QR = YZ (Given)

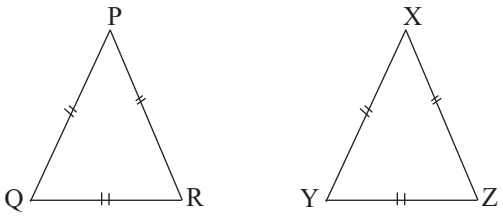
Also, PQ = PR and XY = XZ

(PR = XY)

Thus, PQ = XZ

Hence, By SSS ΔPQR ≅ ΔXYZ

9.



In ΔPQR and ΔSQR

PQ = QS (Given)

PR = SR (Given)

QR = QR (Common)

Thus, ΔPQR ≅ SQR (By SSS)

or ΔQRP ≅ ΔQRS (By SSS)

or ΔRQP ≅ ΔRQP (By SSS)

10. In ΔXPY and ΔXPZ

XP = XP (Common)

∠YXP = ∠ZXP (XP bisect ∠X)

∠XPY = ∠XPZ (each 90°)

ΔXPY ≅ ΔXPZ (BY ASA ΔXPY ≅ ΔXPZ)

XY = XZ (By CPCT)

Thus, ΔXYZ is isoscles

Multiple Choice Questions

1. (a) they are equal in length

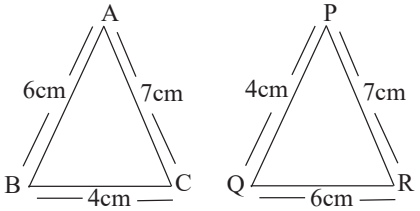
2. (a) they have equal measure

3. (c) Same shape and size

4. (b) Same radius

5. (d) Both (a) and (b)

6.



In ΔABC and RQP

AC = PR (each 7cm)

BC = PQ (each 4cm)

AB = QR (each 6cm)

ΔABC ≅ ΔRQP (By SSS)

(c) ΔABC ≅ ΔRQP

7. (d) XY = PQ & ∠Z = ∠R

8. (d) PR = YZ (Hypoteneuse of the triangles)

9. (b) QR

10. (b) By ASA

11. (a) AAA

12. (c) SSS (as all sides of equilateral triangle are equal of AB = XY, then all six sides would be equal)

13. In ΔAEB and ΔCED

AE = ED (Given)

∠BAE = ∠CDE (each 90°)

∠AEB = ∠CED (Vertically opposite angles)

By ASA ΔAEB = ΔCED

(d) ASA

14. ΔABC ≅ ΔXYZ

BC = YZ = 5cm (By C.P.CT)

(b) 5cm

15. In ΔABD and ΔACD

AB = AC (Isoscles triangle)

∠ADB = ∠ADC (each 90°)

AD = AD (Common)

ΔABD = ΔACD (By RHS)

(b) RHS

Check your Progress

1. No, are AAA does not comes in congruency rule.

2. Yes, by SAS rule ΔPQR ≅ ΔXYZ

3. ΔPQR ≅ ΔXYZ

PQ = XY = 5cm

PR = XZ = 7cm

∠Q = ∠Y = 60°

4. Yes, as circles with same radius are congruent

5. Yes

6. Not all squares hace same size hence, all squares are not congruent

7. Since all three angles are 60 the triangles are equilateral triangles

8. Since, ∠ABC ≅ ∠PQR

∠PQR = ∠ABC = 105°

9. ΔXYZ ≅ ΔDEF

XY = ΔE = 7.5 (By C.P.C.T)

10. ∠P + ∠Q + ∠R = 180° (Angle sum property)

50° + 70° + ∠R = 180 ∠Q

∠R = 60°

8 Comparing Quantities

Exercise 8.1

1. (a) 1km = 1000m

7km = (7 × 1000)m

= 7000m

Ratio of 500m to 700m

$= \frac{500}{7000} = \frac{500 \div 500}{7000 \div 500} = \frac{1}{14}$

(b) 1 day = 24 hours

1 hour = 60 minutes

24 hours = (24 × 60) minutes

= 1440 minutes

Ratio of 420 minutes to 1440 minutes

$= \frac{420}{1440} = \frac{400 \div 40}{1440 \div 40} = \frac{11}{36} = 11:36$

(c) 1year = 365 days

Ratio of 75 days to 365 days

$= \frac{75}{365} = \frac{75 \div 5}{365 \div 5} = \frac{15}{73}$

= 15:73

(d) ₹700 to ₹350

Ratio of ₹700 to ₹3500

$\frac{700}{350} = \frac{700 \div 350}{365 \div 350} = \frac{2}{1}$

= 2:1

(e) 1*l* = 1000m*l*

2500m*l* to 1000m*l*

$= \frac{2500}{1000} = \frac{2500 \div 500}{1000 \div 500} = \frac{5}{2}$

= 5:4

(f) 1 minutes = $\frac{1}{60}$hours

300 minutes = $\frac{300}{60}$hours

= 5 hours

Ratio of 20 hours to 5 hours

$= \frac{20 \div 5}{5 \div 5} = \frac{4}{1}$

= 4:1

(g) 1km = 1000m

50km 560m = (50 × 1000)m + 560m

= (50000 + 560)m = 50560m

1km = 100m

10km = (10 × 1000)m = 10000m

Ratio of 50560m + 1000m

$= \frac{50560}{1000} = \frac{50560 \div 80}{1000 \div 80} = \frac{632}{125}$

= 632 : 125

(h) 1l = 1000ml

Ratio of 1000ml to 7000ml

$\frac{1000}{7000} = \frac{1000 \div 1000}{7000 \div 1000} = \frac{1}{7} = 1:7$

(i) 1 paise = ₹$\frac{1}{100}$

₹8 and 500p = ₹5 + ₹$\frac{500}{100}$

= ₹(8 + 5)

= ₹13

Ratio to ₹13 to ₹4

$= \frac{13}{4} = 13:4$

2. Quantity of wheat 760

Quantity of Rice: 900

Ratio of wheat to Rice: $\frac{760}{900}$

$\frac{760 \div 20}{900 \div 20} = \frac{38}{45} = 38:45$

Ratio of wheat to Rice = $\frac{760}{900}$

$\frac{760 \div 20}{900 \div 20} = \frac{45}{38} = 45:38$

3. Number of Cows: 650

Number of Buffaloes: 800

Number of Goats: 350

Ratio of the Cows to Buffaloes to Goats: 60 : 800 : 350

(650/50) : (800/50) : (350/50)

= 13 : 16 : 7

4. Ratio of 2 number = 10:7

Let the first number 10x and Let the second number be 7x

10x – 7x = 147, 3x = 147, x = $\frac{147}{3}$, x = 49

10x = 10 × 49 = 490, 7x = 7 × 49 = 343

Hence, the number are 490 and 343.

5. Let the number of toffees with Shantanu be 9x1

Let the number of toffees with Srijan be 5x

According to Question

$9x = 5x + 60$, $9x - 5x = 60$, $7x = 60$, $x = \frac{60}{4}$, $x = 15$

Number of toffees with shantanv in the beginning = $9x = 9 \times 15 = 135$ toffes

Number of toffes with Srijan in the beginning: $5x = 5 \times 15 = 75$ toffees

6. Let the numerator be 6x

Let the denominator be 7x

According to question

$\frac{6x - 4}{7x + 1} = \frac{7}{11}$, $11 \times (6x - 4) = 7 \times (7x + 1)$

$66x - 44 = 49 \times +7$

$66x - 49x = 7 + 44$

$17x = 51$

$x = \frac{51}{17}$, $x = 3$

Numerator = $6x = 6 \times 3 = 18$

Denominator = $7x = 7 \times 3 = 21$

Original fraction = $\frac{18}{21}$

7. Ratio of Kavita and John's investement

$= ₹\frac{2,00,000}{2,50,000} = \frac{₹4}{₹5} = 4:5$

Since, profit is shared in the ratio of investment Let be 4x and 5x. The profit earned by Kavita and John respectively

Total profit = 4x + 5x

$9x = 1,44,000$

$x = \frac{1,44,000}{9} = 16,000$

$4x = 4 \times 16000$

$= 64000$

$5x = 5 \times 10000$

$= 80000$

Hence, Kavita and John will get a profit of ₹80,000 & 64,000 respectively

8. Let Property with Sanya be 9x

Let Property with Tanya be 7x

$9x - 7x = 20, 000, 2x = 10000, x = \frac{10000}{2}$, $x = 5000$

$9x = 9 \times ₹5000 = ₹45000$, $7x = 7 \times ₹5000 = ₹35000$

Solution: Sanya recived ₹45000, and Tanya received ₹35, 000.

9. Let length be 5x, and breadth be 3x

Perimeter = 2(Length + Breadth)

$128 = 2(5x + 3x)$

$128 = 2(8x) = 128 = 16x$, $x = \frac{128}{16}$, $x = 8$

Length = $5x = 5 \times 8cm = 40cm$, Breadth = $3x = 3 \times 8cm = 24cm$

10. Let the ratio of the angle be x

Angles of Pentagon: 2x, 4x, 2x, 1x, 1x

Sum of all the angles of the side

$2x + 4x + 2x + 1x + x = 540°$

$10x = 540°$

$x = \frac{540}{10}$, $x = 54°$, $2x = 2 \times 54 = 108°$

$4x = 4 \times 54 = 216°$, $2x = 2x \times 54 = 108°$, $x = 54°$, $x = 54°$

11. Let the ratio of the angles of the triangle be x

$4x + 5x + 6x = 180°$ (Sum of angles of the triangle is 180°)

$15x = 180°$

$x = \frac{180}{15} = 12°$

$4x = 4 \times 12° = 48°$, $5x = 5 \times 12° = 60$

$6x = 6 \times 12° = 72°$

12. Let the Ratio of the sides of the triangle be x

Perimeter of triangle = Sum of its sides

$1x + 2x + 3x = 63$

$6x = 63cm$, $x = \frac{63}{6}cm$, $x = 10.5cm$

$1x = 1 \times 1.5 = 1.5cm = 1.5$, $2x = 2 \times 1.5cm = 3cm$, $3x = 3 \times 1.5cm = 4.5cm$

Hence, the length of the sides of the triangle are 1.5cm, 3cm and 4.5cm respectively

13. Let the ratio of the rectangular field be x.

Length & Breadth

Area of the rectangular field = Length × Breadth

$150cm^2 = 2x \times 3x$

$150cm^2 = 6x^2$

$x = \frac{150}{6}$cm

$x = 25$cm

$2x = (2 \times 25)$cm $= 50$cm

$3x = (3 \times 25)$cm $= 75$cm

14. Let the number that is required to be subtracted from numerator and denominator of the fraction $\frac{7}{8}$ to make it $\frac{4}{5}$ be x

So, $\frac{7 - x}{8 - x} = \frac{4}{5} = 5 \times (7 - x) = 4(8 - x)$

$35 - 5x = 32 - 4x$

$35 - 32 = -4x + 5x$

$x = 3$

Hence, 3 is required to be subtracted from $\frac{7}{8}$ to make it $\frac{4}{5}$.

Puzzle

Let Daniel's Apples be 5x, and Kiran's Apples be 7x

$5x = 35$

$x = \frac{35}{5}$

$x = 7$

$7x = 7 \times 7$

$= 49$

Hence, Kiran has 49 Apples.

Exercise 8.2

1. Cost of 25 Sharpners = ₹112.50

Cost of 1 Sharpners = ₹$\frac{112.50}{25}$ = ₹4.50

Therfore, Cost of 1 Sharpner is ₹4.50

2. Let x be the mean propartion between 2 and 8

$\therefore$ 2, x, x, 8 are proportion

$2 : x :: x : 8$

$x \times x = 2 \times 8$

$x2 = 16, x = 4$

3. The ratios will equilvalent if $\frac{56}{94} = \frac{28}{47} = \frac{84}{141}$

Product of extremes = Product of means

$56 \times 47 = 28 \times 94$

$2632 = 2632$

And,

$28 \times 141 = 47 \times 84$

$3948 = 3948$

Hence, the ration $\frac{56}{94}$, $\frac{28}{47}$ and $\frac{84}{141}$ are equivalent

4. Let the time to cover 280km be x

Distance : Distance :: Time : Time

$120 : 280 :: 1.5 : x$

$120 \times x = 280 \times 1.5$

$120x = 420$

$x = \frac{420}{120}$

1 minutes = $\frac{1}{60}$ hours

1 hour 30 minutes = 1 hours + $\frac{30}{60}$ hours

1 hours + $\frac{1}{2}$hours = 1 hours + 0.5hours

= 1.5 hours

Hence, it will take 3.5 hours for the train to cover 280km.

$x = 3.5$

5. The ratios will be equivalent when $\frac{130}{150} = \frac{65}{70}$

Product of extremes = Product of means

$130 \times 70 = 150 \times 65$

$9100 \neq 9750$

Hence, the ratios $\frac{130}{150}$ & $\frac{65}{70}$ are not equivalent.

6. Number of apples in a box: 30

Cost of 1 box = ₹354

Cost of 1 Apple = ₹$\frac{354}{30}$ = ₹11.8

Hence, Cost of 1 Apple is ₹11.8

7. Let the actual distance for 2.5cm be x.

$1 : 1,00,000 :: 2.5 : x$

$1 \times x = 2.5 \times 1,00,000$

$x = 2,50,000$ cm

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

2,50,000cm = $\frac{2,50,000}{100000}$km = 2.5km

Hence, his house is 2.5km away from the school

8. Let the number of people on that day be x.

Number of people : Number of People :: Wages : Wages

350 : x :: 71750 : 92250

350 × 92250 = x × 71750

32,287,500 = x × 71750

$x = \frac{32,287,500}{71750}$

x = 450, Hence, there were 450 on that day.

9. Let the cost of 160 people be x

Number of people : Number of people :: Cost : Cost

38: 160:: 4650:x

3 × x = 160 × 4650

$x = \frac{744,000}{38}$

x = 19587.94

Hence, the cost for 160 people is ₹19578.94

10. Let the amount of Manura required for 1000 plants be x

Number of trees : Number of trees :: Manure required : M anure required

250250 × x = 2350 × 1000

$x = \frac{2350000}{250}$, x = 9400

Answer: 9400 kg of manure is requaired from planting 1000 plants

11. Let the worth of goods sold by Nivedita be x.

Worth of goods : Worth of goods :: Commission : Commission

25,5,360 : x :: 42,560 : 38,500

25,360 × 38500 = 42,560 × x

9,831,360,00 = 42560 × x

x = 9,8,31,360,000

42560 Hence, Nivedita sold the goods of worth ₹231000

x = 231,000

Exercise 8.3

1. Cost of 26 meters of ribbon: ₹312

Cost of 1 metre of ribbon: $₹\frac{312}{26}$ = ₹12

Cost of 70 metre of ribbon: ₹(12 × 70)

= ₹840

Answer: 70 Metres of ribbon cost ₹840

2. 1 dozen = 12

Number of Bananas in 2.4kg = 12

Number of Bananas in 1kg = $\frac{12}{2.4}$ = 5

Number of Bananas in 10.2 kg = (5 × 10.2) Bananas

= 51 Bananas

Hence, threr will be 51 Bananas in 10.2kg

3. Number of birds producing 750eggs : 1000

Number of producing 1 egg = $\frac{1000}{750}$ = 1.33

Number of producing 4500 eggs = 4500 × 1.33

= 6000

Therefore, 6000 birds provides and average of 4500 eggs.

4. Distance covered in 3 hours = 1950km

Distance covered in 1 hours = $\frac{1950}{3}$

= 650km

Distance covered in $8\frac{1}{2}$ hours = $(650 \times 8\frac{1}{2})$ km

=(₹325 ×325~~650~~ $\frac{17}{2}$)km = 5525km

Hence, 5, 525km will be covered in $8\frac{1}{2}$km

5. Protien provided by 1250g of yoghurt = 4.5g

Protien provided by 1g of yoghurt = $\frac{4.5}{1250}$ = 0.0036

Protien provided by 1000g of yoghurt = 0.0036 × 1000

Therefore 3.6g of protien is provided by 1000 = 3.6g of yogurt

6. Amount contributed by 240 students : ₹36,000

Amount contributed by 1 students : ₹$\frac{36000}{240}$ = ₹150

Number of Students required for contributing amount of ₹1,20,000 = $\frac{1,20,000}{150}$

= 800

Hence 800 students will be reqired for contributing ₹1,20,000 for donation

7. Total wages of 450 labours : ₹1,17000

Wages of 1 labour = ₹$\frac{1,17,000}{450}$ = ₹260

Wages of 120 labour = ₹(260 × 120)

= ₹31200

Total wages if 120 more laboures are added = ₹1,17,200 + ₹31,200

= ₹1,48,400

8. Consumption of rice by 161 members : 64.4kg

Consumption of rice by 1 member = $\frac{64.4}{161}$ = 0.4kg

If 50 more members are included then total number of members = 161 + 50 = 211

Total Consumption of rice by 211 members = (211 × 0.4)kg

= 84.4kg

Hence, 84.4 kg of rice needed for 1 day if 50 members are added in the family.

Exercise 8.4

1.

Decimal	0.3	$\frac{60}{100} = 0.6$	0.4	$70\% = \frac{70}{100} = 0.7$
Fraction	$\frac{3}{10}$	$\frac{60}{100} = \frac{6}{10}$	$0.4 = \frac{4}{10} = \frac{2}{5}$	$0.7 = \frac{7}{10}$
Equilvalent fraction out of 100	$\frac{30}{100}$	$\frac{60}{100}$	$0.4 = \frac{4}{10} = \frac{4 \times 10}{10 \times 10} = \frac{40}{100}$	$70\% = \frac{70}{100}$
Percentage	30%	$\left(\frac{60}{100} \times 100\right)\% = 60\%$	$\left(\frac{60}{100} \times 100\right)\% = 40\%$	70%

Decimal	$\frac{3}{10} = 0.3$	0.5	$\frac{90}{100} = 0.9$	$75\% = \frac{75}{100} = 0.75$
Fraction	$\frac{3}{10}$	$0.5 = \frac{5}{10}$	$\frac{90}{100} = \frac{9}{10}$	$75 = \frac{75}{10}$
Equilvalent fraction out of 100	$\frac{3}{10} = \frac{3 \times 10}{10 \times 10} = \frac{30}{100}$	$\frac{5 \times 10}{10 \times 10} = \frac{50}{100}$	$\frac{9 \times 10}{10 \times 10} = \frac{9}{100}$	$\frac{75}{100}$
Percentage	$\left(\frac{3}{10} \times 100\right)\% = 30\%$	$(0.5 \times 100)\% = 50\%$	$\left(\frac{90}{100} \times 100\right)\% = 90\%$	$\left(\frac{75}{100} \times 100\right)\% = 75\%$

(ii) (a) Fraction = 1/1100

Decimal = 0.01

Percentage = 1%

(b) Fraction = $\frac{5}{100}$

Decimal = $\frac{5}{100} = 0.05$

Percentage $(\frac{5}{100} \times 100)\% = 5\%$

(c) Fraction = $\frac{10}{100}$

Decimal = $\frac{10}{100}$

Percentage = $(\frac{10}{100} \times 100)\% = 10\%$

(d) Fraction = $\frac{15}{100}$

Decimal = $\frac{15}{100} = 0.15\%$

Percentage = $(\frac{15}{100} \times 100)\% = 15\%$

(e) Fraction = $\frac{25}{100}$

Decimal = $\frac{25}{100} = 0.25$

Percentage = $(\frac{25}{100} \times 100)$

= 25%

(f) Fraction = $\frac{30}{100}$

Decimal = $\frac{30}{100} = 0.30$

Percantage = $(\frac{30}{100} \times 10)0\% = 30\%$

(g) Fraction = $\frac{50}{100}$

Decimal = $\frac{50}{100} = 0.50$

Percantage = $(\frac{50}{100} \times 100)\% = 50\%$

(h) Fraction = $\frac{75}{100}$

Decimal = $\frac{75}{100} = 0.75$

Percantage = $(\frac{75}{100} \times 100)\% = 75\%$

(b)

Fraction in the simplest form	$\frac{1}{4}$	$\frac{20}{100} = \frac{1}{5}$	$0.44 = \frac{44}{100} = \frac{11}{25}$	$95\% = \frac{95}{100} = \frac{95}{100} = \frac{19}{20}$
Fraction with 100 as denominator	$\frac{25}{100}$	$\frac{20}{100}$	$0.44 = \frac{44}{100}$	$95\% = \frac{95}{100}$
Decimal	0.25	$\frac{25}{100} = 0.25$	0.44	$95\% = \frac{95}{100} = 0.95$
Percentage	25%	$\left(\frac{20}{100} \times 100\right)\% = 20\%$	$(0.44 \times 100\%) = 44\%$	95%

Fraction in the simplest form	$\frac{65}{100} = \frac{13}{20}$	$\frac{1}{25}$	$50\% = \frac{50}{100} = \frac{1}{2}$
Fraction with 100 as denominator	$\frac{65}{100}$	$\frac{1}{25} = \frac{1 \times 4}{25 \times 4} = \frac{4}{100}$	$50\% = \frac{50}{100}$
Decimal	$\frac{65}{100} = 0.65$	$\frac{1}{25} = 0.04$	$50\% = \frac{50}{100} = 0.50$
Percentage	$\left(\frac{65}{100} \times 100\right)\% = 65\%$	$\left(\frac{1}{25} \times 100\right)\% = 4\%$	50%

2. (a) $\frac{1}{5} = (\frac{1}{5} \times 100)\% = 20\%$

(b) $\frac{4}{5} = (\frac{4}{5} \times 100)\% = 80\%$

(c) $\frac{3}{4} = (\frac{3}{4} \times 100)\% = 75\%$

(d) $\frac{1}{40} = (\frac{1}{40} \times 100)\% = 2.5\%$

(e) $\frac{7}{25} = (\frac{7}{25} \times 100)\%$

$= (7 \times 4)\% = 28\%$

3. (a) $7\% = \frac{7}{100}$

(b) $200\% = \frac{200}{100} = \frac{2}{1}$

(c) $50\% = \frac{50}{100} = \frac{1}{2}$

(d) $16\frac{2}{3}\% = \left(\frac{3 \times 16 + 2}{3}\right)\%$

$\left(\frac{48 + 2}{3}\right)\% = \frac{50}{3}\%$ $\frac{016.6}{100} = 0.166$

(e) $3\frac{1}{3}\% = \left(\frac{3 \times 33 + 2}{3}\right)\% = \frac{100}{3}\% = 0.3333$

Exercise 8.5

1. (a) $₹600 \times \frac{10}{100} = ₹\frac{6000}{100} = ₹60$

(b) $800m \times \frac{20}{100} = 1600m \times \frac{1}{5} = 320m$

(c) $200 \times \frac{8}{100} = \frac{1600}{100}km = 16km$

(d) $200 \times \frac{40}{100} = \frac{8000}{100} = 80$

(e) $\frac{10}{100} \times 500 = \frac{5000}{100} = 50$

(f) $\frac{20}{100} \times ₹\frac{20000}{100} = ₹200$

(g) $\frac{90}{100} \times ₹4.40 = ₹\frac{39.600}{100} = ₹3.96$

(h) $\frac{50}{100} \times 36$

$= 0.50 \times 36$

$= 18.00$

(i) $\frac{500}{100} \times ₹45.50 = ₹\frac{22750}{100} = 227.50$

(j) $\frac{25}{100} \times ₹300 = ₹\frac{7500}{100} = ₹75$

2. (a) Let the whole journey be x

10% of x = 72

$\frac{10\ x}{100} = 72$

$= 10x = 72 \times 100 = 10x = 7200,\ x = 720$

Hence, the whole journey is of 720km

(b) 5% of toal sales = ₹4

$\frac{5 \times \text{total sales}}{100} = ₹4 = \text{Total sales} = \frac{₹5 \times 100}{100}$

$= ₹\frac{400}{5} = ₹80$

(c) Let the orignal cost of the shirt be x

x + 20% = ₹120

$\frac{x}{1} + \frac{20 \times x}{100} = ₹120$

$\frac{100x + 20x}{100} = ₹120$

$120x = ₹(120 \times 100)$

$x = ₹\frac{12000}{120}$

x = ₹100

Hence, the orignal cost of shirt is ₹100.

(d) Let the total marks be x

20% of x = 80

$\frac{20 \times x}{100} = 80,\ 20x = 80 \times 100,\ x = \frac{8000}{20},\ x = 400$

Total marks is ₹400.

(e) Let the population of the town be x.

$x + 5\%$ of $x = 150$

$x + \frac{5 \times x}{100} = 150 = \frac{x}{1} + \frac{5x}{100} = 150 = \frac{100x + 5x}{100} = 105x = 105 \times 100$

$x = \frac{10500}{105}$, $x = 100$

Population of the town is 100.

(f) Let the sum invested be x

16% of $x = ₹434$, $\frac{16 \times x}{100} = ₹434$, $x = ₹434 \times \frac{100}{16}$, $x = ₹271.25$

Sum invested is ₹2712.50

(g) Let the cost of Saree be x

$x - 40\%$ of $x = 400$

$x - \frac{40 \times x}{100} = 400$, $\frac{x}{1} - \frac{40x}{100} = 400$, $\frac{100x}{100} - 40x = 400$, $60x = 40000$

$x = \frac{40000}{60}$, $x = 66.67$

Hence, the cost of saree is ₹666.67

3. (a) 5% of 4800 peoples

$\frac{5}{100} \times 4800$ people

$= 5 \times 48$ people $= 240$ people

(b) 75% of 7200 mangoes

$\frac{75}{100} \times 7200$

$75 \times 72 = 5{,}400$

(c) $16\frac{2}{3}\%$ of 50km

$\frac{50}{3}\%$ of $50 = \frac{50 \times 50}{3 \times 100}$

$\frac{2500}{300} = 8.33$

(d) 40% of 5000cm

$\frac{40}{100} \times 5000$

$= \frac{200000}{100} = 2000$

(e) 45% of ₹900

$\frac{45}{100} \times 900$

$= \frac{40500}{100} = 405$

4. (a) 20, 60

$\frac{20}{60} \times 100$

$= \frac{2000}{60}\% = \frac{100}{3} = 33\frac{1}{3}\%$

(b) ₹90, ₹360

$₹\frac{90}{360} \times 100 = ₹\frac{9000}{360} = ₹\frac{2}{9}$

(c) 25cm, 100cm

$\frac{25}{360}$cm $\times 100 = \frac{2500}{100}$m

$= 25$cm

(d) 3.6kg, 7.2kg

$\frac{3.6}{7.2} \times 100 = \frac{360}{7.2}$

5. Let marks obtainded by Himanshi in math be x

Total marks obtainded by Himani : English, Hindi and Mathematics $= 60 + 50 + x = 100 + x$

Total marks $= 100 + 100 + 100 = 300$

Marks obtainded in maths

$\frac{\text{Marks obtainded}}{\text{Total marks all three subjects}}$ = Percantage obtainded in

$\frac{110 + x}{30} = 60\% = \frac{110 + x}{300} = \frac{60}{100}$

$(110 + x) \times 100 = 60 \times 300$

$11000 + 100x = 18000$

$110x = 18000 - 11000$

$x = \frac{7000}{100}$

$x = 70$

6. Ashok's total Salary: ₹36,000

Percentage of salary spent on house rent: 25%

= 25% of Ashok's total salary

$= \frac{25}{100} \times ₹36000 = ₹900$

Amount spent on food items: ₹7,200

Total amount spent on food items and house rent: ₹(9000 + 7200)

Parcent of salary spent upon food = ₹16200

Items house rent: $(\frac{16200}{3600} \times 100)\%$

$\frac{16200}{36}\%$

= 45%

Hence, the spent 45% on food items & house rent.

7. Let the total number of votes be x

Ashish got 40% of the total votes

$\frac{40}{100} \times x = 300 \cancel{12000} \times \frac{100}{\cancel{40}}$

x = 30000

Percantage of total number of people who did not vote: Percentage of Total number of voted – (Percentage of people votes Ashish + Percentage of people voted Ashok

= 100% – 65%

= 35%

Hence, 35% of people did not voted in total.

8. Percentage of marks scored in Hindi: 40%

Percentage of marks in English: 60%

Marks obtainded in maths: 90

Marks obtainded in hindi = $100 \times \frac{40}{100} = 40\%$

Marks obtainded in English = $100 \times \frac{60}{100}$ = 60%

Percantage of marks he got in total = $\frac{40 + 60\ 90}{300} \times 100$

$\frac{190}{3} = 63.33\%$

9. Total percentage of population = Percentage of men + Percentage of woment + Pecentage of children

100% = 50% + 25% + % of children

Percentage of children = 25%

Let the total population fo the city be x

25% of x = 25000

$\frac{25}{100} \times x = 25000$

$x = 10000 \cancel{25000}\ \frac{10}{\cancel{25}}1$

Hence, there are 100000 people in the city

10. Room rent of per day: ₹3500

Room rent for 2 days = ₹(3500 × 2)

= ₹7000

Amount of luxury tax for 1 day: 8% of Room rent = $\frac{8}{\cancel{100}}\ \cancel{7000}35 = 280$

Amount of luxuary tax for 2 days = ₹280 × 2

= ₹560

Total Amount paid = ₹(7000 + 560)

= ₹7560

Hence Mr. Sihna paid ₹7560 for the room.

11. Percantage of Amount nickel = Total % of alloy – (Percantage copper + Percantage of zine)

= 100 – (20% + 40%)

= 100 – 60% = 10%

Amount of nickel in 40kg of alloy

= 40% of 40kg of alloy = $\frac{40}{\cancel{100}} \times \cancel{40}$

= 16kg

Therefore, there is 16kg of Nickel in 40kg of alloy.

13. Amount decreased = ₹(40000 – 25000)

= ×15000

Decreased percent = $\frac{\text{Decrease in cost of house}}{\text{Orignal cost of house}} \times 100$

= ₹$\frac{15000}{\cancel{40000}} \times \cancel{100}$ ₹$\frac{\cancel{15000}}{\cancel{400}}$ = ₹37.5%

Hence, decrease percent is 37.5%

14. Total number of Seats in the threatre: 2000

Number of seats in the balcony: 20% of total seats

= $\frac{20}{\cancel{100}} \times \cancel{2000} = 400$

= ₹80000

Number of seats in the rear stall = 50% of total seats

= $\frac{50}{\cancel{100}} \times \cancel{2000} = 1000$

Cost of rear stall = ₹(1000 × 50)

= ₹50000

Number of seats in the front stall = 100% – (50% + 20%)

= 100% – 70% = 30%

30% of total seats = $\frac{30}{\cancel{100}} \times \cancel{2000} = 600$

Cost of front stall seats = 600 × ₹25

= ₹15000

Total collection for a show in a housefull situcation = ₹(80000 + 50000 + ₹15000)

= ₹1,45,000

Therefore, there will be a collection of ₹145000 in a houseful situation.

Exercise 8.6

1. (a) Shirt: Profit = S.P – C.P

= 500 – 400 = ₹100

Profit% = $\frac{\text{Profit}}{\text{CP}} \times 100$

= $\frac{100}{\cancel{400}} \times \cancel{100} = 25\%$

(b) Notebook: Profit = S.P – C.P

= 60 – 50 = ₹10

Profit% = $\frac{\text{Profit} \times 100}{\text{CP}}$

= $\frac{10}{1\cancel{50}} \cancel{100}^{2} = 20\%$

(c) Wagon R = Profit = S.P – C.P

= 45,050 – 40000

= ₹5050

Profit% = $\frac{\text{Profit} \times 100}{\text{CP}}$

= $\frac{5050}{40000} \times \cancel{100} \times 12.5\%$

(d) House = Profit = S.P – C.P

50,00,000 – 25,00,000

= 25,00,000

Profit% = $\frac{\text{Profit} \times 100}{\text{CP}}$

$\frac{25,00,000}{25,00,000} \times 100 = 100\%$

2. (a) Profit = $15000 \times \frac{10}{100} = ₹1500$

S.P = C.P + Profit

= 15000 + 1500 = ₹16500

(b) Loss = $14,500 \times \frac{10}{100} = ₹14050$

S.P = C.P – Loss

= 140500 = 1405 = ₹126,450

(c) Loss = $25000 \times \frac{15}{100} = ₹3750$

S.P – C.P –Loss

= 25000 – 3750 = ₹21250

(d) Profit = $50000 \times \frac{8}{100} = ₹4000$

S.P = C.P + Profit

= 50000 + 4000 = ₹54000

(e) Profit = $45000 \times \frac{20}{100} = ₹9000$

S.P = C.P + Profit

= 45000 + 9000 = ₹54000

3. (a) Let C.P be 100

Profit = 20% of 100 = ₹20

S.P = C.P + Profit

S.P = 100 + 20 = ₹120

If S.P ₹120then, C.P = ₹100

If S.P ₹15000 + then, C.P = $\frac{100}{120} \times 1500$

= ₹12500

(b) Let C.P be 100

Loss = 15% of 100 = ₹15

S.P = C.P Loss, S.P = 100 – 15 = ₹85

If S.P = 85, then C.P = ₹100

If S.P ₹8000, then

C.P = ₹$\frac{100}{85} \times 8000$

= ₹9411.76

(c) Let C.P be 100

Loss = 13% of 100 = ₹17

S.P = C.P – Loss, 100 – 13 = ₹87

If, S.P = ₹87, then C.P = ₹100

If S.P = 42800, then

C.P = $\frac{100}{87} \times 42800$

= ₹49195.40

(d) Let C.P be 100

Profit = 12% of 100 = ₹12

S.P = C.P + Profit = 100 + 12 = ₹112

If, S.P = ₹112, then C.P = ₹100

If, S.P = ₹16000 then,

C.P = $\frac{100}{112} \times 16000$

= ₹14285.7

4. Assume the C.P of each T.V is ₹100

S.P of first T.V = C.P + 20% Profit

$= 100 + \frac{20}{100} \times 100$

= ₹120

S.P of second T.V = C.P 10% Profit

$= 100 + \frac{10}{100} \times 100$

= ₹110

5. Let the S.P of each pen be x

S.P of 10 pens = 10x

S.P of 11 pens = 11x

Given: CP of 11 pencils = SP of 10 pens = 10x

Here, S.P < C.P

Loss = C.P – S.P

= 11x – 10x = x

$\text{Profit\%} = \frac{\text{Profit}}{\text{C.P}} \times 100 = \frac{x}{10x} \times 100 = 10\%$

6. Let C.P of Shirt be ₹100

Loss = 20% of 100 = ₹20

S.P = C.P – Loss

= 100 – 20 = ₹80

If S.P = 80, then C.P = ₹100

If S.P = 900, then $\text{C.P} = \frac{100}{80} \times 900$

= ₹1125

7. S.P = ₹570

Loss% = 5%

Let C.P be 100

$\text{Loss} = 100 \times \frac{5}{100}$

= ₹5

S.P = C.P – Loss

= 100 – 5

= ₹95

If S.P = 95 then = ₹100

If S.P = 570, hten $\text{C.P} = \frac{100}{95} \times 570$

= ₹600

If S.P = ₹630

Profit = S.P – C.P

= 630 – 600 = ₹30

$\text{Profit\%} = \frac{\text{Profit}}{\text{CP}} \times 100$

$= \frac{30}{600} \times 100\%$

$5\% = \frac{3000}{6}\%$

5% = 5%

Hence, C.P of the article is ₹5.

Exercise 8.7

1. (a) $\text{Intrest} = \frac{\text{P} \times \text{R} \times \text{T}}{100}$

$= ₹\frac{1500 \times 12 \times 2}{100}$

$= \frac{36000}{100}$ ₹360

Amount: Simple Intrest + Principal

= 360 + 1500

= ₹1860

(b) $\text{Intrest} = \frac{\text{P} \times \text{R} \times \text{T}}{100}$

$\frac{500 \times 12 \times 4}{100} = \frac{24000}{100} = 240$

Amount: Simple Intrest + Principal

= 500 + 240 = ₹740

(c) $\text{Intrest} = \frac{3000 \times 10 \times 2}{100} = \frac{60000}{100} = ₹600$

Amount: Simple Intrest + Principal

= 600 + 3000 = ₹3600

2. (a) $\text{Intrest} = \frac{\text{P} \times \text{R} \times \text{T}}{100}$

$8400 = \frac{4000 \times \text{R} \times 5}{100}$

$840000 = 20000 \times \text{R}$

$\text{R} = \frac{840000}{20000}$

R = 42%

(b) $\text{Intrest} = \frac{\text{P} \times \text{R} \times \text{T}}{100}$

$120 = \frac{5000 \times \text{R} \times 3}{100}$

$120000 = 15000 \times \text{R}$

$\text{R} = \frac{1,20000}{15000}$

R = 8%

(c) $\text{Intrest} = \frac{\text{P} \times \text{R} \times \text{T}}{100}$

$1275 = \frac{7500 \times \text{p} \times 5}{100}$

$127500 = 37500 \times \text{p}$

$\text{P} = \frac{127500}{37500}$

P = 3.4%

(d) Intrest $= \frac{P \times R \times T}{100}$

$1500 = \frac{6000 \times p \times 3}{100}$

$150000 = 18000 \times P$

$P = \frac{150000}{18000}$

$P = 8.33\%$

3. (a) Intrest $= \frac{P \times R \times T}{100}$

$40000 = \frac{P \times 6 \times 5}{100}$

$400000 = P \times 30$

$P = \frac{400000}{30} = 1333.33$

(b) Intrest $= \frac{P \times R \times T}{100}$

$6000 = \frac{P \times 6 \times 4}{100}$

$6000 \times 100 = P \times 20$

$P = \frac{600000}{20}$, $P = 30000$

4. Time = 4 years, Rate = 8

Intrest $= \frac{P \times R \times T}{100}$ Simple Intrest $= \frac{P \times 4 \times 8}{100}$

Time = 4 years, Rate = 6

Intrest $= \frac{P \times R \times T}{100}$ Simple Intrest $= \frac{P \times 6 \times 4}{100}$

According to Question

$\frac{P \times 4 \times 8}{100} = \frac{P \times 6 \times 4}{100} + 56$

$\frac{P \times 32}{100} = \frac{P \times 24}{100} + 56$

$\frac{32P}{100} = \frac{24P}{100} + 56$

$\frac{32P}{100} = \frac{24p + 5600}{100}$

$32p \times 100 = 100(24p + 5600)$

$3200p = 2400p + 560000$

$3200p - 2400p = 560000$

$800p = 560000$

$P = \frac{560000}{800}$

$P = 700$

Hence, the sum is ₹7

Review Exercise

1. Let the number of men be 4x

Let the number of Women be 3x

$4x + 3x = 179900$

$7x = 179900$

$x = \frac{179900}{100}$, $x = 25700$

$3x = 3 \times 25700 = 77100$

Hence, the number of Woment voters are 77100

2. (a) Proportion: Product of means = Product of extremes

$8 \times 12 = 8 \times 9$

$9 \neq 72$

Hence, they are not in proportion

(b) Proportion: Product of means = Product of extremes

$21 \times 7 = 49 \times 4$

$147 \neq 156$

Hence, they are not in Proprtion

(c) Proportion: Product of means = Product of extremes

$3 \times 49 = 21 \times 7$

$147 = 147$

Hence they are in proportion

(d) Proportion: Product of means = Product of extremes

$21 \times 7 = 49 \times 4$

$147 \neq 776$

Hence they are not in Proportion

(e) Proportion: Product of means = Product of extremes

$3 \times 32 = 18 \times 9$

$64 \neq 72$

Hence they are not in Proportion

(f) Proportion: Product of means = Product of extremes

$15 \times 9 = 10 \times 12$

$135 \neq 120$

Hence they are not in Proportion

3. Let the enlayed length be x

Length : Length :: Breadth : Breadth

19 : x :: 11 : 351

$19 \times 351 = 11 \times x$

$\frac{6669}{11} = x$

x = 606.27cm

4. Producting of milk in 1 day : 38500l

Producting of milk in 30 days

$= (38500 \times 30)l$

= 1155000l

5. Let the ratio of the angles of the quadrilateral be x

Sum of the angles of a quadrilatral = 360°

So, 1x + 2x + 3x + 4x + = 360

10x = 360

x = 36°

1x = 1 × 36° = 36°, 2x = 2 × 36° = 72°, 3x = 3 × 36° = 108°, 4x × 36° = 144°

6. The ratio of Similar triangle is equal.

Let the missing sides of the traingle be x & y respectively

$\frac{9}{x} = \frac{12}{y} = \frac{18}{12}$

9 : x :: 18 : 12

$9 \times 12 = 18 \times x$

$10 = 18x$

$x = \frac{108}{18} = 6$

$\frac{12}{y} = \frac{18}{12}$

$12 \times 12 = 18 \times y$

$144 = 18y$

$y = \frac{144}{18}$

y = 8

Hence, the ised of he triangle are 6cm & 5cm respectively.

7. Let the ratio of distribution of Profit be x

30x + 70x = 1,70,000

100x = 170000

$x = \frac{170000}{100}$

x = 1700

30x = 30 × 1700 = 51000

70x = 70 × 1700

= 119000

Hence, Nivdedia and Rajit got 51,000 and 1,19,000 respectively.

8. Number of foreign curreny that can be exchanged for ₹53.80 Indian rupees = ₹53.30

Number of foregin currency that can be excanges for ₹45730 = $\frac{45730}{53.80}$

= 850

Hence, we can get 850 foreign currencies for ₹45730

9. Distance covered in 1/2 hour = 90km

Distance covered in 1 hour = 90 ÷ 1/2 90 ÷ 1.5

Distance covered in 6 hours 30 minutes = 60

= 60 × 6 hours 30 minutes

(1minutes = $\frac{1}{60}$ hours = 0.5 hours)

= 60 × 6.5 hours

= 390km

Hence, the train will cover 390km in 6 hours and 30 minutes.

10. (a) $200 : 120 = \frac{200}{120} = \frac{200 \div 40}{120 \div 40} = \frac{5}{3} = 5 : 3$

(b) $200 : 160 = \frac{200}{160} = \frac{200 \div 40}{160 \div 40} = \frac{5}{4} = 5 : 4$

(c) $120 : 160 = \frac{120}{160} = \frac{120 \div 40}{160 \div 40} = \frac{3}{4} = 3 : 4$

conform to ansh sir Total amount of ingrediant = 160g + 200g + 120g

= 480g

Ratio = $\frac{160}{480} = \frac{1}{3} = 1 : 3$

$= \frac{200}{480} = \frac{5}{12} = 5 : 13$

$= \frac{120}{480} = \frac{1}{4} = 1 : 4$

$\frac{1}{3}, \frac{5}{12}, \frac{1}{4}$

LCM = 12

$\frac{4}{12}, \frac{5}{12}, \frac{3}{12}$

Ratio = 4 : 5 : 3

$\frac{4}{12} \times 192 = 64g$, $\frac{5}{12} \times 192 = 80g$, $\frac{3}{12} \times 192 = 48g$

11. Let the ratio be x

3x, 4x

$3x + 4x = ₹1001$

$7x = 1001$, $x = 143$

Anil: $3x = 3 \times 143 = 429$, Dinesh: $4x = 4 \times 143 = ₹572$

12. Let the sides of rectangle be x

Length = 5x, Breadth = 3x, Length = Breadth + 16

$5x = 3x + 16$, $5x - 3x = 16$, $2x = 16$, $x = 8$

Length = $5x = 5 \times 8 = 40cm$, Breadth = $3x = 3 \times 8 = 24cm$

13. Let the number of girls be 5x

$5x = 1120$, $x = \frac{1120}{5}$, $x = 24$

Number of boys = $7x = 7 \times 224 = 1568$

14. Distance travelled in 6 hours = 240km

Distance travelled in 1 hour = $\frac{240}{6}$km = 40km

Distance travelled in $3\frac{1}{2}$hours = $40 \times 3\frac{1}{2} = 40 \times \frac{7}{2} = 140km$

Hence, the car will cover distance of 140km in $3\frac{1}{2}$hours.

15. Let the Property with A be 3x

Let the Property with B be 4x

Let the Property with C be 7x

$3x + 4x + 7x = 560000$

$14x = 560000$

$x = \frac{560000}{14}$

$x = 40000$

$3x = 3 \times 40000 = ₹120000$

$4x = 4 \times 40000 = ₹160000$

$7x = 7 \times 40000 = ₹280000$

Hence, A, B and C recived ₹120000, ₹160000 and ₹280000 respectively.

16. Quantity of litre required for 23km = 1litre

Quanity of litre required for 1 km = $\frac{1}{23}l$

Quanity of litre required for 384km = $\frac{1}{23} \times 384km$

$= 16.6956l$

He required $16.6956l$ for travelling 384km.

17. (a) $800 \times \frac{10}{100} = ₹80$

(b) $500 \times \frac{25}{100} = ₹125$

(c) $200 \times \frac{25}{100} = 50kg$

(d) $80 \times \frac{10}{100} = 8m$

(e) $480 \times \frac{8}{100} = 38.4l$

(f) $400 \times \frac{22}{100} = 50kg$

(g) $550 \times \frac{11}{100} = ₹60.5$

(h) $60 \times \frac{12}{100} = 72g$

18. Let the orignal cost of T.V be x

x + 20% of x = 2000

$x + \frac{12}{100}x = 2000$

$\frac{100x + 20x}{100} = 2000$

$120x = 200000$

$x = \frac{200000}{120}$

$= ₹166.86$

19. Cost of 1kg of rice: ₹32

Cost of 20kg of rice: ₹20 × 36

$= ₹720$

Total price = ₹(720 + 800)

$= ₹1520$

After mixing both of the rice.

Total quantity = 50kg

Cost of 1kg of rice = ₹38

Cost of 50kg of rice = ₹38 × 50 = ₹1900

Cost of 1kg of rice: ₹32

Cost of 25kg of rice = ₹32 ₹ 25

$= ₹800$

Gain Percantage = $\frac{S.P - C.P}{C.P} \times 100$

$= \frac{1900 - 1520}{1520} \times 100 = \frac{380}{1520} \times 150$

$= 25\%$

Multiple choice Questions

1. 1kg = 1000g, 2kg = 2 × 1000g = 2000g

800g to 2000g = $\frac{800}{2000} = \frac{800 \div 400}{2000 \div 400} = \frac{2}{5}$

(b) 2 : 5

2. 9 : P x :: x : 16

$9 \times 16 = x^2$

$144 = x^2$

x = 12

(b) 12

3. Let the 2nd term be x

3 : x :: 15 : 35

3 × 35 = 15 × x

= 105 = 15x, x = $\frac{105}{15}$

x = 7

(b) 7

4. a : b :: c : d

Product of mean = Product of extremes

a × d = b × c

= ad = bc

(c) ab = bc

5. 3 : 33 = x : 3663

$\frac{3}{33} = \frac{x}{3663} = \frac{10981}{33} = 333$

(a) 333

6. Amount paid for 14 days: ₹1190

Amount paid for 1 days: ₹$\frac{1190}{14}$ = ₹85

Amount paid for 6days = ₹85 × 6 = ₹510

(d) ₹510

7. Cost of 9 pencils = ₹56.70

Cost of 1 pencil = ₹$\frac{56.70}{9}$ = ₹6.30

Cost of 18 pencil = ₹6.30 × 18

= ₹113.40

(a) ₹113.40

8. Let the xs share be 2x and ys and be 3x

2x + 3x = 280, 5x = 280, x = 56

2x = 2 × 56 = 112, 3x = 3 × 56 = 168

(c) 112 : 168

9. Cost of 9 books: ₹315

Cost of 1 books: $\frac{315}{9}$ = ₹35

Cost of 16 books = ₹(35 × 16)

= ₹560

(a) ₹560

10. Distance Covered in 3 hours = 195 km

Distance covered in 1 hour = $\frac{3}{195}$km

Distance covered in 130km = $\frac{3}{195} \times 130 = \frac{290}{195} = 2$

Hence, the bus will cover 130km in 2 hours.

11. 4 : 1 = $\frac{4}{1} = \frac{4}{1} \times 100\% = 400\%$

(d) 400%

12. 4% = $\frac{4}{100} = \frac{4 \div 4}{100 \div 4} = \frac{1}{25}$ (a) $\frac{1}{25}$

13. 0.45 = $\frac{45}{100} = \frac{45 \div 5}{100 \div 5} = \frac{9}{20}$ = (b) $\frac{9}{20}$

14. 400% of 1 = $\frac{400}{100} \times 1 = 4$ (a) 4

15. 1% of 500

$\frac{1}{100} \times 500 = 5$

16. $\frac{60}{100} \times 500 = 60 \times 5 = 300$km

(d) 300km

17. $\frac{20}{100} \times 95$

= $\frac{1900}{100}$ = 19days

(c) 19 days

18. S.P = ₹25

Profit = 25

C.P = 25 – 25

C.P = 0

Profit% = $\frac{CP}{100}$

= $\frac{0}{100}$

19. C.P = ₹600, S.P = ₹540

Loss% = $\frac{Loss}{C.P} \times 100$

Loss = C.P – S.P = ₹(600 – 540) = ₹60

$\frac{60}{600} \times 100 = \frac{6000}{600} = 10\%$

(b) 10%

Check Your Progress

1. 4 : 9, 5 : 9

$\frac{4}{9}, < \frac{5}{9}$ (4 < 5)

2. Third

3. $17 : 85 = \frac{17}{85} = \frac{17 \div 17}{85 \div 17} = \frac{1}{5} = 1 : 5$

4. 1m = 100cm

3.2m = 3.2 × 100cm

= 320

$= \frac{320}{20} = \frac{320 \div 17}{20 \div 20} = \frac{16}{1} = 16 : 1$

5. Yes as $5 : 3 = \frac{5}{3} = 1.666$

and $3 : 5 = \frac{3}{5} = 0.6$

6. On Proptin product on mean = Product fo extremes

= 6 × 9 = 7 × 8

54 ≠ 56

No 6, 7, 8, 9 are not in proportion

7. 1 dozen = 12

Cost of 1 pencil = ₹36

Cost of 1 pencil = $\frac{36}{12}$ = ₹3

Cost of 25 pencil = ₹125 × 37

= ₹75

8. Cost of 70 labours = ₹5600

Cost of 1 labour = $\frac{5600}{7}$ = ₹800

Cost of 35 labour = ₹(800 × 35)

= ₹28000

9. $\frac{3}{4} \times 100 = \frac{300}{4} = 75\%$

10. $4 : 5 = \left(\frac{4}{5} \times 100\right)\% = \frac{400}{5}\% = 80\%$

11. 25% of 50

$2\frac{25}{\cancel{100}} \quad \cancel{50}^{1}$

= 12.5

12. 100% of 200

$\frac{100}{100} \times 200$

= 200

13. (10% 80) + 10

$\left(\frac{10}{100} \times 80\right) + 10$

= 8 + 10 = 18

14. $\frac{65}{100} = \left(\frac{65}{100} \times 100\right)\%$

= 65%

15. Let the whole length be x

$\frac{25}{100} \times x = 50$

$x = 2\cancel{50} \times \frac{100}{\cancel{25}}^{1}$

x = 200

16. P = ₹500, Rate = 5%, Time = 2 years

$S.I = \frac{P \times R \times T}{100}$

$S.I = \frac{500 \times 5 \times 2}{100} = \frac{2000}{100} = 10\%$

17. 0.75 as percentage

= 0.75 × 100 = 75%

18. $45\% = \frac{45}{100} = \frac{45 \div 5}{100 \div 5} = \frac{9}{20}$

9 Rational Numbers

Exercise 9.1

1. (a) $\frac{1}{2}$ (It can be Written in the form of $\frac{P}{9}$ where $q \neq 0$ hence it is rational number)

(b) $\frac{3}{5}$ (It can be Written in the form of $\frac{P}{9}$ where $q \neq 0$ hence it is rational number)

(c) $6 = \frac{6}{1}$ (It can be Written in the form of $\frac{P}{9}$ where $q \neq 0$ hence it is rational number)

(d) $0 = \frac{0}{1}$ (It can be Written in the form of $\frac{P}{9}$ where $q \neq 0$ hence it is rational number)

(e) $\frac{0}{9}$ (It can be Written in the form of $\frac{P}{9}$ where $q \neq 0$ hence it is rational number)

(f) $\frac{3}{0}$ (It is not a rational number as $q = 0$)

2. (a) Positive

(b) Positive

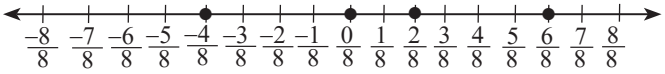
(c) Positive

(d) Negative

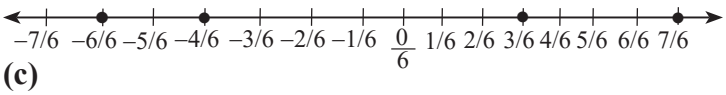
(e) Negative

(f) Negative

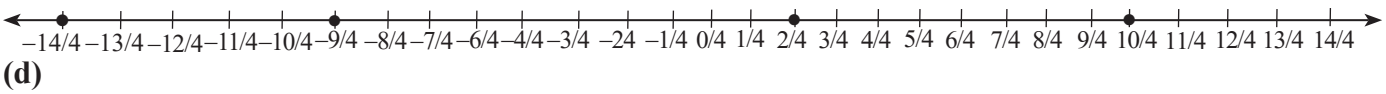
3. (a)



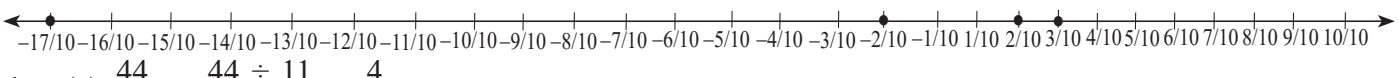
(b)



(c)



(d)



4. (a) $\frac{44}{55} = \frac{44 \div 11}{55 \div 11} = \frac{4}{5}$

(b) $\frac{-6 \div 6}{78 \div 6} = \frac{-1}{13}$

(c) $\frac{35 \div 35}{70 \div 35} = \frac{1}{2}$

(d) $\frac{44 \div 4}{100 \div 4} = \frac{-11}{25}$

(e) $\frac{39 \div 13}{169 \div 13} = \frac{3}{13}$

(f) $\frac{7 \div 7}{56 \div 7} = \frac{1}{8}$

5. (a) $\frac{-7}{8}$ (Simplest from as p and q have number common factor other than 1)

(b) $\frac{16}{48}$ (Not in Simplest from as p & q have common factor other than 1)

(c) $\frac{19}{25}$ (Simplest from as p and q have number common factor other than 1)

(d) $\frac{70}{98}$ (Not in Simplest form as p and q have common factors other than 1)

Exercise 9.2

1. (a) $1 \times 36 = 6 \times \square$

$\square = \frac{36}{6}$

$\square = 6$

(b) $\frac{3}{4} = \frac{\square}{-24}$

$-24 \times 3 = 4 \times \square$

$\square = \frac{-72}{6}$

$\square = -18$

(c) $\frac{5}{11} = \frac{\square}{99}$

$5 \times 99 = 11 \times \square$

$\square = \frac{495}{11}$

$\square = 45$

(d) $\frac{-9}{27} = \frac{\square}{-21}$

$-21 \times -9 = 27 \times \square$

$\frac{189}{27} = \square$

$\square = 7$

(e) $-9 \times 39 = 13 \times \square$

$-351 = 13 \times \square$

$\square = -27$

(f) $\frac{1}{7} = \frac{\square}{63}$

$1 \times 63 = 7 \times \square$

$\square = \frac{63}{7}$

$\square = 9$

2. (a) $\frac{1}{-5} = \frac{4}{\square}$

$1 \times \square = 20$

$\square = 20$

(b) $\frac{-3}{7} = \frac{21}{\square}$

$-3 \times \square = 21 \times 7$

$\square = \frac{147}{3}$

$\square = 49$

(c) $8 \times \square -4 \times 9$

$\square = \frac{-36}{8}$

$\square = 4.5$

(d) $\frac{36}{63} = \frac{-4}{\square}$

$\square = \frac{-252}{36}$

$\square = -7$

(e) $\frac{8}{12} = \frac{-2}{\square}$

$\square = \frac{-24}{8}$

$\square = -3$

(f) $\frac{16}{48} = \frac{-4}{\square}$

$16 \times \square = 48 \times -4$

$\square = \frac{-192}{16}$

$\square = -12$

3. (a) $4 \times 13 = 5 \times 9$

$52 > 45$

$\frac{4}{9} > \frac{4}{3}$

(b) $24 \times 37 = 13 \times 41$

(c) $-7 \times 21 = -12 \times 12$

$-147 < -144$

$\frac{-4}{12} < \frac{-12}{21}$

(d) $19 \times 19 = 14 \times 10$

$361 > 140$

$\frac{19}{41} > \frac{10}{19}$

(e) $73 \times 13 = 81 \times 10$

$-3 \times 10 = -4 \times 7$

$-30 > -47$

$\frac{-3}{7} > \frac{-4}{10}$

4. (a) 5

(b) $\frac{9}{5}$

(c) $\frac{7}{4}$

(d) $\frac{5}{13}$

(e) 33

(f) $\frac{32}{48}$

5. **(a)** (i) $\frac{8}{10}, \frac{6}{7}, \frac{12}{13}, \frac{-2}{4}, \frac{-4}{5}$

(LCM of 10, 7,13, 4 and 5 is $2 \times 2 \times 5 \times 7 \times 13 = 1820$)

2	10, 7, 13, 4, 5
2	5, 7, 13, 2, 5
5	5, 7, 13, 1, 5
7	1, 7, 13, 1, 1
13	1, 1, 13, 1, 1
	1, 1, 1, 1, 1

$\frac{8}{10} = \frac{8 \div 182}{10 \div 182} = \frac{1456}{1820}$

$\frac{6}{7} = \frac{6 \times 260}{7 \times 260} = \frac{1560}{1820}$

$\frac{12 \times 140}{13 \times 140} = \frac{1680}{1820}$

$\frac{-2 \times 455}{4 \times 455} = \frac{-910}{1820}$

$\frac{-4 \times 365}{5 \times 365} = \frac{-1460}{1820}$

$\frac{-1460}{1820} < \frac{-910}{1820} < \frac{1456}{1820} < \frac{1560}{1820} < \frac{1680}{1820}$

$(-1460 < -910 < 1456 < 1560 < 1680)$

$\therefore \frac{-4}{5} < \frac{-2}{4} < \frac{8}{10} < \frac{6}{7} < \frac{12}{13}$

(ii) $\frac{6}{9}, \frac{6}{7}, \frac{-7}{5}, \frac{12}{13}, \frac{3}{4}$

(LCM of 9, 7, 5, 13 and 4 is $2 \times 2 \times 5 \times 3 \times 3 \times 7 \times 13 = 16380$)

2	9, 7, 5, 13, 4
2	9, 7, 5, 13, 2
5	9, 7, 5, 13, 1
3	9, 7, 1, 13, 1
3	3, 7, 1, 13, 1
7	1, 7, 1, 13, 1
13	1, 1, 1, 13, 1
	1, 1, 1, 1, 1

$\frac{6}{9} = \frac{6 \times 1820}{9 \times 1820} = \frac{10920}{16380}$

$\frac{6 \times 23040}{7 \times 2340} = \frac{14040}{16380}$

$\frac{-7}{5} = \frac{-7 \times 3269}{5 \times 3276} = \frac{-3269}{16380}$

$\frac{12 \times 1260}{13 \times 1260} = \frac{15120}{16380}$

$\frac{3}{4} = \frac{3 \times 4095}{4 \times 4095} = \frac{12285}{16380}$

$\frac{-3269}{16380} < \frac{10920}{16380} < \frac{12285}{16380} < \frac{14040}{16380} < \frac{15120}{16380}$

$(-3269 < 10920 < 12285 < 14040 < 15120)$

$\therefore \frac{-7}{5} < \frac{6}{9} < \frac{3}{4} < \frac{6}{7} < \frac{12}{13}$

(b) (i) $\frac{8}{11}, \frac{3}{6}, \frac{12}{6}, \frac{2}{7}, \frac{18}{17}$

(LCM of 11, 6, 6, 7 and 17 is $2 \times 3 \times 11 \times 7 \times 17 = 7854$)

2	11, 6, 6, 7, 17
3	11, 3, 3, 7, 17
11	11, 1, 1, 4, 17
7	1, 1, 1, 7, 17
17	1, 1, 1, 1, 17
	1, 1, 1, 1, 1

$\frac{8}{11} = \frac{8 \times 714}{11 \times 714} = \frac{5712}{7854}$

$\frac{3 \times 1309}{6 \times 1309} = \frac{3927}{7854}$

$\frac{12}{6} = \frac{12 \times 1309}{6 \times 1309} = \frac{15708}{7854}$

$\frac{2 \times 1122}{7 \times 1122} = \frac{2244}{7854}$

$\frac{18 \times 462}{17 \times 462} = \frac{8316}{7854}$

$\frac{15708}{7854} > \frac{8316}{7854} > \frac{5712}{7854} > \frac{3927}{7854} > \frac{2244}{7854}$

$(15708 > 8316 > 5712 > 3927 > 2244)$

$\therefore \frac{12}{6} > \frac{18}{17} > \frac{8}{11} > \frac{3}{6} > \frac{2}{7}$

(ii) $\frac{-14}{17}, \frac{7}{16}, \frac{7}{13}, \frac{-9}{13}, \frac{2}{6}$

(Lcm of 17, 16, 13, 13 and 6 is $13 \times 17 \times 2 \times 2 \times 2 \times 3 = 10608$)

$\frac{-14}{17} = \frac{14 \times 624}{17 \times 624} = \frac{-8736}{10608}$

$\frac{7}{16} = \frac{7 \times 665}{16 \times 663} = \frac{4641}{10608}$

$\frac{7}{13} = \frac{7 \times 816}{13 \times 816} = \frac{5712}{10608}$

$\frac{-9}{13} = \frac{9 \times 816}{13 \times 816} = \frac{-7344}{10608}$

$\frac{2}{6} = \frac{2 \times 1768}{6 \times 1768} = \frac{3536}{10608}$

$\frac{5712}{10608} > \frac{4641}{10608} > \frac{3536}{10608} > \frac{-8736}{10608} > \frac{-7344}{10608}$

$\frac{7}{16} > \frac{7}{13} > \frac{2}{6} > \frac{-14}{17} > \frac{-9}{13}$

13	17, 16, 13, 13, 6
17	17, 16, 1, 1, 6
2	1, 16, 1, 1, 6
2	1, 8, 1, 1, 3
2	1, 4, 1, 1, 3
2	1, 2, 1, 1, 3
3	1, 1, 1, 1, 3
	1, 1, 1, 1, 1

6. $\frac{-6}{8}, \frac{-4}{9}$ (LCM of 8 and 9 is 72)

$\frac{-6 \times 9}{8 \times 9} = \frac{-54}{72}, \frac{-4 \times 8}{9 \times 8} = \frac{-32}{72}$

$\frac{-32}{72} > \frac{-33}{72} > \frac{-34}{72} > \frac{-35}{72} > \frac{-36}{72} > \frac{-37}{72} > \frac{-38}{72} > \frac{-39}{72} > \frac{-40}{72} > \frac{-41}{72} > \frac{-42}{72} > \frac{-43}{72} > \frac{-44}{72} > \frac{-45}{72} > \frac{-46}{72} > \frac{-47}{72} > \frac{-48}{72} > \frac{-49}{72} > \frac{-50}{72} > \frac{-51}{72} > \frac{-52}{72} > \frac{-53}{72} > \frac{-54}{72}$

Hence, 5 rational number between $\frac{-6}{8}$ and $\frac{9}{4}$ are $\frac{-33}{72}, \frac{-34}{72}, \frac{-35}{72}, \frac{-36}{72}$ and $\frac{-37}{72}$.

7. $\frac{-2}{6}, \frac{-5}{14}$ (LCM of 6 and 14 is 42)

(Multiple of LCM of 6 and 14 is 210

$\frac{-4 \times 35}{6 \times 35} = \frac{-70}{210}$

$\frac{-5 \times 15}{14 \times 15} = \frac{-75}{210}$

$\frac{-70}{210} > \frac{-71}{210} > \frac{-72}{210} > \frac{-73}{210} > \frac{-74}{210}, \frac{-75}{210}$

Rational number between $\frac{-2}{6}$ and $\frac{-5}{14}$ are $\frac{-71}{210} > \frac{-72}{210} > \frac{-73}{210} > \frac{-74}{210}$

Exercise 9.3

1. (a) $\frac{1}{9} + \frac{5}{9} = \frac{1+5}{9} = \frac{6}{9} = \frac{2}{3}$

(b) $\frac{3}{12} + \frac{-7}{12} = \frac{3+(-5)}{12} = \frac{-2}{12} = \frac{-1}{6}$

(c) $\frac{-7}{8} + \frac{-5}{8} = \frac{-7+(-5)}{8} = \frac{-3}{2}$

(d) $\frac{19}{13} + \frac{24}{13} = \frac{19+24}{13} = \frac{43}{13}$

(e) $\frac{-18}{17} + \frac{-4}{17} = \frac{-18+(-4)}{17} = \frac{-22}{17}$

(g) $\frac{29}{21} + \frac{-9}{21} = \frac{29+(-9)}{21} = \frac{20}{21}$

2. (a) $\frac{7}{8} + \frac{1}{2}$

LCM of 8 and 2 is 8

$\frac{7 \times 1}{8 \times 1} = \frac{7}{8}$

$\frac{1 \times 4}{2 \times 4} = \frac{4}{8}$

$\frac{7}{8} + \frac{4}{8} = \frac{7+4}{8} = \frac{11}{8}$

(b) $\frac{3}{6} + \frac{-2}{12}$

LCM of 6 and 12 is 12

$\frac{3 \times 2}{6 \times 2} = \frac{6}{12}$

$\frac{3 \times 2}{12 \times 2} = \frac{-3}{12}$

$\frac{6}{12} + \left(\frac{-3}{12}\right) = \frac{6+(-3)}{12} = \frac{6-3}{12} = \frac{3}{12}$

(c) $\frac{-7}{12} + \frac{-4}{36}$

LCM of 12 and 36 is 36

$\frac{-7 \times 3}{12 \times 3} = \frac{-21}{36}, \frac{-4 \times 1}{36 \times 1} = \frac{-4}{36}$

$\frac{21}{36} + \left(\frac{-4}{36}\right) = \frac{21+(-4)}{36}$

$= \frac{21-4}{36} = \frac{17}{36}$

(d) $\frac{2}{4} + \frac{1}{12}$

LCM of 4 and 12 is 12

$\frac{2 \times 3}{4 \times 3} = \frac{6}{12}, \frac{1 \times 1}{12 \times 1} = \frac{1}{12}$

$\frac{6}{12} + \frac{1}{12} = \frac{6+1}{12} = \frac{7}{12}$

(e) $\frac{-6}{20} + \frac{-4}{5}$

LCM of 20 and 5 is 20

$\frac{-6 \times 1}{20 \times 1} = \frac{-6}{20}$

$\frac{-4 \times 4}{5 \times 4} = \frac{-16}{20}$

$\frac{-6}{20} + \frac{-16}{20} = \frac{-6+(-16)}{20}$

$\frac{-6-16}{20} = \frac{-22}{20}$

(f) $\frac{-3}{4} + \frac{18}{12}$

LCM of 4 and 12 is 12

$\frac{-3 \times 3}{4 \times 3} = \frac{-9}{12}$

$\frac{18 \times 1}{12 \times 1} = \frac{18}{12}$

$\frac{-9}{12} + \frac{18}{12} = \frac{-9+18}{12} = \frac{9}{12} = \frac{3}{4}$

3. (a) $\frac{3}{4} + \frac{3}{9}$

LCM of 4 and 9 is 36

$\frac{3 \times 4}{4 \times 9} = \frac{27}{36}, \frac{3 \times 4}{9 \times 4} = \frac{12}{36}$

$\frac{27}{36} + \frac{12}{36} = \frac{27+12}{36} = \frac{39}{36} = \frac{13}{12}$

(b) $\frac{1}{10} + \left(-\frac{1}{8}\right)$

LCM of 10 and 8 is 80

$\frac{1 \times 8}{10 \times 8} = \frac{8}{80}$

$\frac{-1 \times 10}{8 \times 10} = \frac{-10}{80}$

$\frac{8}{80} + \left(\frac{-10}{80}\right) = \frac{870}{80} = \frac{-2}{80} = \frac{-1}{40}$

(c) $\frac{2}{12} + \left(\frac{-3}{4}\right)$

LCM of 12 and 4 is 12

$\frac{2 \times 1}{12 \times 1} = \frac{8}{80}$

$\frac{-3 \times 3}{4 \times 3} = \frac{-9}{80}$

$\frac{2}{12} + \left(\frac{-9}{12}\right) = \frac{2 + (-93)}{12} = \frac{-7}{12}$

(d) $\left(\frac{-3}{4}\right) + \left(\frac{-2}{5}\right)$

LCM of 4 and 5 is 20

$\frac{-3 \times 5}{4 \times 5} = \frac{-15}{20}, \frac{-2 \times 4}{5 \times 4} = \frac{-8}{20}$

$\frac{-15}{20} + \left(\frac{-8}{20}\right) = \frac{-15 + (-8)}{20}$

$= \frac{-23}{20}$

(e) $\frac{4}{7} + \frac{5}{3}$

LCM of 7 and 3 is 21

$\frac{4 \times 3}{7 \times 3} = \frac{12}{21}, \frac{5 \times 7}{3 \times 7} = \frac{35}{21}$

$\frac{12}{21} + \frac{35}{21} = \frac{12 + 35}{21} = \frac{47}{21}$

(f) $\left(\frac{-7}{9}\right) + \frac{8}{9}$

$\frac{-7 + 8}{9} = \frac{1}{9}$

(g) $\frac{6}{7} + \left(\frac{-3}{4}\right)$

LCM of 7 and 4 is 28

$\frac{6 \times 4}{7 \times 4} = \frac{24}{28}$

$\frac{-3 \times 7}{4 \times 7} = \frac{-21}{28}$

$\frac{24}{28} + \left(\frac{-21}{28}\right)$

$= \frac{24 + (-21)}{28}$

$= \frac{24 - 21}{28} = \frac{3}{28}$

(h) $\left(\frac{-1}{7}\right) + \frac{1}{5}$

LCM of 7 and 5 is 35.

$\frac{-1 \times 5}{7 \times 5} = \frac{-5}{35}$

$\frac{1 \times 7}{5 \times 7} = \frac{7}{35}$

$\frac{-5}{35} + \frac{7}{35} = \frac{-5 + 7}{35}$

$= \frac{2}{35}$

(i) $\frac{7}{7} + \left(\frac{-1}{7}\right)$

$= \frac{7 - 1}{7} = \frac{6}{7}$

4. (a) $\left(\frac{-7}{7}\right) + \frac{3}{9} + \frac{1}{6}$

LCM of 7, 9 and 6 is = 126

$\frac{-7 \times 18}{7 \times 18} = \frac{-126}{126}$

$\frac{-126}{126} + \frac{42}{126} + \frac{21}{126} + \frac{-126 + 42 + 21}{126}$

$= \frac{-126 + 63}{126} = \frac{-63}{126} = \frac{-1}{2}$

(b) $\frac{1}{3} + \left(\frac{-3}{4}\right) + \frac{7}{3}$

LCM of 3, 4, and 3 is 12.

$\frac{1 \times 4}{3 \times 4} = \frac{4}{12}$

$\frac{-3 \times 3}{4 \times 3} = \frac{-9}{12}$

$\frac{7 \times 4}{3 \times 4} = \frac{28}{12}$

$\frac{4}{12} + \left(\frac{-9}{12}\right) + \frac{28}{12} = \frac{4 + (-9) + 28}{12}$

$= \frac{32 - 9}{12} = \frac{23}{12}$

(c) $\frac{1}{6} + \frac{5}{12} + \left(\frac{-1}{16}\right)$

LCM of 6, 12 abd 16 is 48

$\frac{1 \times 8}{6 \times 8} = \frac{4}{48}$

$\frac{5 \times 4}{12 \times 4} = \frac{20}{48}$

$\frac{-1 \times 3}{16 \times 3} = \frac{-3}{48}$

$\frac{4}{48} + \frac{20}{48} + \left(\frac{-3}{48}\right) = \frac{8 + 20 + (-3)}{48}$

$= \frac{28 - 3}{48} = \frac{25}{48}$

(d) $\frac{4}{10} + \left(\frac{-13}{45}\right) + \left(\frac{-9}{25}\right)$

LCM of 10, 15 and 25 is 150

$\frac{4 \times 15}{10 \times 15} = \frac{60}{150}$

$\frac{-13 \times 10}{15 \times 10} = \frac{-54}{150}$

$\frac{60}{150} + \left(\frac{-130}{150}\right) + \left(\frac{-54}{150}\right)$

$\frac{60 + (-130) + (-54)}{150}$

$= \frac{60 + (-184)}{150}$

$= \frac{60 - 184}{150} = \frac{-124}{150} = \frac{-62}{75}$

(e) $3\frac{1}{7} + \left(\frac{-5}{18}\right) + \left(\frac{-7}{72}\right) + 2\frac{3}{4}$

$\frac{22}{7} + \left(\frac{-5}{18}\right) + \left(\frac{-7}{72}\right) + \frac{11}{4}$

LCM of 7, 18, 72 and 4 504

$\frac{22 \times 72}{7 \times 72} = \frac{1584}{504}$

$\frac{-5 \times 28}{18 \times 28} = \frac{-240}{504}$

$\frac{-7 \times 7}{72 \times 7} = \frac{-49}{504}$

$\frac{11 \times 126}{4 \times 126} = \frac{1386}{504}$

$\frac{1584}{504} + \left(\frac{-240}{504}\right) + \left(\frac{-49}{504}\right) + \frac{1386}{504}$

$= \frac{1584 + (-240) + (-49) + 1386}{504}$

$\frac{1584 - 240 - 49 + 1386}{504}$

$= \frac{2970 - 289}{504} = \frac{2681}{504}$

(f) $5\frac{2}{7} - \frac{8}{9} + \left(\frac{-3}{14}\right)$

$\frac{37}{7} - \frac{8}{9} + \left(\frac{-3}{14}\right)$

LCM of 7, 9 and 14 is 126

$\frac{37 \times 18}{7 \times 18} = \frac{666}{126}$

$\frac{8 \times 14}{9 \times 14} = \frac{-112}{126}$

$\frac{-3 \times 9}{14 \times 9} = \frac{-27}{126}$

$\frac{666}{126} - \frac{-112}{126} + \left(\frac{-27}{126}\right)$

$\frac{666 - 112 + (-27)}{126}$

$\frac{666 - 139}{126} = \frac{527}{126}$

5. (a) Additive inverese of $\frac{3}{4}$ is $\frac{-3}{4}$

$\frac{8}{10} - \frac{3}{4}$

LCM of 10 and 4 is 40

$\frac{8 \times 4}{10 \times 4} = \frac{32}{40}$

$\frac{3 \times 10}{4 \times 10} = \frac{30}{40}$

$\frac{32}{40} - \frac{30}{40} = \frac{32 - 30}{40}$

$= \frac{2}{40} = \frac{1}{20}$

(b) Additive inverese of $\frac{-3}{5}$ is $\frac{3}{5}$

$\frac{3}{5} - \left(\frac{-3}{5}\right) = \frac{5}{6} + \frac{3}{5}$

LCM of 6 and 5 is 30

$\frac{5 \times 5}{6 \times 5} = \frac{25}{30}, \frac{3 \times 6}{5 \times 6} = \frac{18}{30}$

$\frac{25}{30} + \frac{18}{30} = \frac{25 + 18}{30} = \frac{43}{30}$

(c) Additive inverse of $\frac{-4}{7}$ is $\frac{4}{7}$

$\frac{-7}{3} - \left(\frac{-4}{7}\right) = \frac{-7}{3} + \frac{4}{7}$

LCM of 3 and 7 is 21

$\frac{-7 \times 7}{3 \times 7} = \frac{-49}{21}$

$\frac{-4 \times 3}{7 \times 3} = \frac{12}{21}$

$\frac{-49}{21} + \frac{12}{21} = \frac{-49 + 12}{21}$

$= \frac{-37}{21}$

(d) Additive inverse of $\frac{6}{7}$ is $\frac{-6}{7}$

$\frac{-10}{10} - \frac{6}{7}$

(LCM of 10 and 7 is 70)

$\frac{-10 \times 7}{10 \times 7} = \frac{-70}{7}$

$\frac{6 \times 10}{7 \times 10} = \frac{60}{70}$

$= \frac{-70}{7} - \frac{60}{70} = \frac{70 - 60}{70} = \frac{10}{70}$

(e) $\frac{5}{8} - \left(\frac{-2}{4}\right)$

(LCM of 4 and 8 is 8)

$\frac{5}{8} \times \frac{1}{1} = \frac{5}{8}, \frac{2}{4} \times \frac{2}{2} = \frac{4}{8}$

$\frac{5}{8} - \left(\frac{-4}{8}\right)$

$= \frac{5}{8} + \frac{4}{8} = \frac{5 + 4}{8} = \frac{8}{8}$

(f) $\frac{-4}{18} - \frac{2}{5}$ [LCM of 18 and 5 is 90]

$\frac{-4 \times 5}{18 \times 5} = \frac{-20}{90}, \frac{-2 \times 18}{5 \times 18} = \frac{-36}{90}$

$\frac{-20}{90} - \frac{35}{90}$

$\frac{-2 - 36}{90} = \frac{-56}{90}$

$= \frac{-28}{45}$

Exercise 9.4

1. (a) $\frac{4}{3} \times \frac{5}{12}$

$= \frac{4 \times 5}{3 \times 12} = \frac{20}{36} = \frac{5}{9}$

(b) $\left(\frac{-8}{11}\right) \times \frac{3}{4}$

$\frac{-8}{11} \times \frac{-40}{11}$

(c) $\left(\frac{-10}{11}\right)$

$\frac{-10 \times 4}{8 \times 10} = \frac{-40}{80} = \frac{-1}{2}$

(d) $\frac{2}{3} \times \frac{1}{2} = \frac{2 \times 1}{3 \times 2} = \frac{2}{6} = \frac{1}{3}$

(e) $\frac{10}{9} \times \left(\frac{-3}{5}\right)$

$= \frac{10 \times 3}{9 \times 5} = \frac{-30}{45}$

$= \frac{-2}{3}$

(f) $\frac{-7}{4} \times \left(\frac{-5}{6}\right)$

$\frac{-7 \times -5}{4 \times 6} = \frac{35}{24}$

(g) $\frac{21}{14} \times \left(\frac{-5}{6}\right)$

$\frac{21 \times -5}{14 \times 6} = \frac{-105}{84} = \frac{-5}{4}$

(h) $\left(\frac{-4}{8}\right) \times \left(\frac{-8}{9}\right)$

$\frac{-4 \times -8}{8 \times 9} = \frac{-32}{72} = \frac{-4}{9}$

2. (a) $\frac{3}{5} \times \frac{10}{9} \times \frac{3}{10}$

$\frac{3 \times 10 \times 3}{5 \times 9 \times 10} = \frac{90}{450} = \frac{1}{5}$

(b) $\frac{-17}{9} \times \frac{3}{9} \times \frac{-13}{3}$

$\frac{-17 \times 3 \times -13}{9 \times 9 \times 3} = \frac{663}{243} = \frac{221}{81}$

(c) $\frac{-8}{15} \times \frac{-5}{4} \times \frac{2}{4}$

$\frac{-8 \times -5 \times -2}{15 \times 4 \times 4} = \frac{80}{120} = \frac{2}{3}$

(d) $-3\frac{1}{5} \times \frac{3}{8} \times 3\frac{1}{3}$

$= \frac{-16}{5} \times \frac{3}{8} \times \frac{10}{3} = \frac{-16 \times 3 \times 10}{5 \times 8 \times 3} = \frac{-480}{120}$

$= \frac{-4}{1}$

(e) $2\frac{1}{5}\left(\frac{5}{11} + 1\frac{6}{11}\right)$

$\frac{11}{5}\left(\frac{5}{11} + \frac{17}{11}\right)$

$\frac{11}{5} \times \frac{5}{11} + \frac{11}{5} \times \frac{17}{11}$

$\frac{11 \times 5}{5 \times 11} + \frac{11 \times 17}{5 \times 11}$

$= \frac{55}{55} + \frac{187}{55} = \frac{55 + 187}{55} = \frac{242}{55} = \frac{22}{5}$

(f) $\frac{1}{2}\left[\left(-\frac{1}{4}\right) + \frac{6}{3}\right]$

$\frac{1}{2} \times \left(-\frac{1}{4}\right) + \frac{1}{2} \times \frac{6}{3}$

$\frac{1}{2} \times \frac{1}{4} + \frac{1 \times 6}{2 \times 3}$

$\frac{1 \times 1}{2 \times 4} + \frac{6}{6} = \frac{1}{8} + \frac{6}{16}$

$\frac{1}{8} + \frac{1}{1} = \frac{1 + 8}{8} = \frac{9}{8}$

3. (a) $\frac{2}{9} \div \frac{8}{14} = \frac{2}{9} \times \frac{14}{8} = \frac{2 \times 14}{9 \times 8} = \frac{28}{72} = \frac{7}{18}$

(b) $\frac{5}{8} \div \frac{14}{5} = \frac{5 \times 14}{8 \times 5} = \frac{70}{40} = \frac{7}{4}$

(c) $\frac{-3}{55} \div \frac{4}{11} = \frac{-3}{55} \times \frac{11}{34} = \frac{-33}{220} = \frac{-3}{20}$

(d) $\frac{56}{8} \div \frac{-3}{8} = \frac{56}{8} \times \frac{-8}{3} = \frac{56 \times -8}{8 \times 3} = \frac{-448}{24}$

$= \frac{-56}{3}$

(e) $\frac{-8}{9} \div \frac{-4}{7} = \frac{-8}{9} \times \frac{-7}{4} = \frac{-8 \times -7}{9 \times 4} = \frac{56}{36}$

$= 1\frac{14}{9}$

(f) $\frac{22}{37} \div \frac{-31}{30} = \frac{22}{37} \times \frac{-31}{31} = \frac{-660}{1147}$

(g) $\frac{2}{3} \div \frac{7}{15} = \frac{2}{3} \times \frac{15}{7} = \frac{2 \times 15}{3 \times 7} = \frac{30}{21} = \frac{10}{7}$

(h) $\frac{24}{3} \div \frac{8}{12} = \frac{24}{3} \times \frac{12}{8} = \frac{24 \times 12}{3 \times 8} = \frac{288}{24}$

$= 12$

Exercise 9.5

1. (a)
$$3\overline{)14}\quad 4.6$$
$$-12$$
$$20$$
$$-18$$
$$20$$
$$-18$$
$$2$$

(b)
$$11\overline{)84}\quad 7.636$$
$$-77$$
$$70$$
$$-66$$
$$40$$
$$-33$$
$$70$$
$$66$$
$$7$$

(c) $7\frac{4}{6} = \frac{46}{6} = 7.66$

$$3\overline{)46}\quad 7.66$$
$$-42$$
$$40$$
$$-36$$
$$40$$
$$-36$$
$$4$$

(d) $\frac{8}{11} = \frac{80}{11} = 0.7272$

$$11\overline{)80}\quad 0.7272$$
$$-77$$
$$30$$
$$-22$$
$$80$$
$$-77$$
$$30$$
$$-22$$
$$8$$

(e) $3\frac{5}{16} = \frac{53}{16} = 3.315$

$$16\overline{)53}\quad 3.315$$
$$-48$$
$$50$$
$$-48$$
$$20$$
$$-16$$
$$40$$
$$-40$$
$$0$$

(f) $\frac{1}{8} = \frac{1}{8} = 0.125$

$$8\overline{)10}\quad 0.125$$
$$-8$$
$$20$$
$$-16$$
$$40$$
$$-40$$
$$0$$

(g) $\frac{3}{5} = \frac{3}{5} = 0.6$

$$5\overline{)30}\quad 0.6$$
$$-30$$
$$0$$

(h) $\frac{4}{7} = \frac{4}{7} = 0.57142$

$$7\overline{)40}\quad 0.57142$$
$$-35$$
$$50$$
$$-49$$
$$10$$
$$-7$$
$$30$$
$$-28$$
$$20$$
$$-14$$
$$6$$

(i) $1\frac{9}{4} = \frac{15}{4}$

$$4\overline{)15}\quad 3.75$$
$$-12$$
$$30$$
$$-28$$
$$20$$
$$-20$$
$$0$$

(j) $2\frac{5}{16} = \frac{37}{16} = 2.325$

$$16\overline{)37}\quad 2.325$$
$$-32$$
$$50$$
$$-48$$
$$20$$
$$-16$$
$$40$$
$$-40$$
$$0$$

(k) $8\frac{5}{16} = \frac{109}{16} = 6.8125$

$$16\overline{)109}\quad 6.8125$$
$$-96$$
$$130$$
$$-128$$
$$20$$
$$-16$$
$$40$$
$$-40$$
$$80$$
$$-80$$
$$0$$

(l) $\frac{3}{15} = \frac{3}{15} = 0.2$

$$5\overline{)30}\quad 0.6$$
$$-30$$
$$0$$

2. (a) 7.305 can be converted in a rational number as it is terminating decimal.

(b) 0.222 cannot be converted into rational number as it is a non–terminating number.

(c) 8.005 can be converted in a rational number as it is terminating decimal.

(d) 91.777 cannot be converted into rational number as it is a non–terminating number.

(e) 83.3 can be converted in a rational number as it is terminating decimal.

(f) 9.3425714 can be converted in a rational number as it is terminating decimal.

(g) 36.123721817 cannot be converted into rational number as it is a non–terminating number.

(h) 8.0 is a whole number hence it can be converted in a rational number.

3. Total number of exposures Amit's camera can take: 72

Number of picture taken at pinic: 48

Part of the film left to be exposed:

$$\frac{\text{Number of pics left to be taken}}{\text{Total number fo expoures Amit's Camera can taken}}$$

$= \frac{24}{72} = \frac{1}{3}$

$\frac{1}{3}$ part of the film is left to be exposed.

4. Orignal cost of a packet of coffee: ₹240

Offer by 1st shopkeeper: $\frac{1}{5}$off = ₹240 – 240 $\times \frac{1}{5}$

= ₹(40 – 48)

= ₹192

Offer by 2nd shopkeeper: $\frac{1}{10}$off = ₹240 – 240 $\times \frac{1}{10}$

= ₹(240 – 24) = ₹216

₹192 < ₹216

Hence, $\frac{1}{5}$ off is a better buy, as he offer higher discount.

Difference in the price: ₹(216 – 192) = ₹24

5. Total number of audience: 600

Number of women = $\frac{1}{2}$ of number of audience

$= \frac{1}{2} \times 600$

= 300

Number of School girls: $\frac{1}{3}$ of women

$= \frac{1}{3} \times 300 = 100$

Hence, there were 100 school girls in the theatre.

6. Amount of book Rohan read: $\frac{1}{2}$ of the book = 0.5 of the book

Amount of book Mohan read: $\frac{5}{6}$ of the book = 0.83 of the book

Amount of book Sohan read: $\frac{2}{3}$ of the book = 0.66 of the book

$\frac{5}{6} > \frac{2}{3} > \frac{1}{2}$m

Hence, Mohan > Sohan > Rohan, read the book from most to least.

7. Jyoti: Sum of numbers is $1\frac{1}{2} = \frac{3}{2}$

$\frac{1}{4} + 1\frac{1}{4} = \frac{1}{4} + \frac{5}{4} = \frac{1+5}{4} = \frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$

Jyoti $\frac{1}{4}$ and $1\frac{1}{4}$ cards.

Rashmi: Sum of number is 1

$\frac{3}{8} + \frac{5}{8} = \frac{3+5}{8} = \frac{8}{8} = 1$

Jyoti have $\frac{3}{8}$ and $\frac{5}{8}$ cards.

Jyotsana: Difference is less than 1

$\frac{11}{16} - 1\frac{5}{8} = \frac{11}{16} - \frac{13}{16} = \frac{11-13}{16} = \frac{-2}{16} = \frac{-1}{16}$

$= -0.125$

$1 > 0.125$

Jyotsna have $\frac{11}{10}$ and $1\frac{5}{8}$ cards

8. Total number of stamps with caroline: 400

Number of Indian stamps: $\frac{1}{10}$ of 400 = $\frac{1}{10} \times 400 = 40$ stamps

Number of remaining stamps: 400 – 40 = 360 stamps

Number of European stamps: $\frac{1}{3}$ of remaining stamps

$= \frac{1}{3} \times 360 = 120$

Number of African stamps: 100

Total number of Indian, European and African stamps: (40 + 120 + 100) Stamps

= 260 Stamps

Number of American stamps: Total number of Stamps – Number of Indian, Europeon and African stamps

= 400 – 260

= 140 stamps

Hence, there were 140 American stamps.

Review Excerise

1. (a) $\frac{23}{43}$ (It can be expressed in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$)

hence, it is a rational number

(b) $\frac{465}{0}$ (It can be expressed in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$)

(c) $345 = \frac{345}{1}$ (It can be expressed in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$)

(d) $1\frac{4}{3} = \frac{7}{3}$ (It can be expressed in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$)

(e) $8\frac{2}{4} = 3\frac{4}{4}$ (It can be expressed in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$)

(f) $\frac{16}{3}$ (It can be expressed in the form of $\frac{p}{q}$ where p and q are integers and $q \neq 0$)

2. (a) $-16 \times 8 = -3 \times 50$

$-128 > -150$

$\therefore \frac{-16}{50} > \frac{-3}{8}$

(b) $7 \times 10 = 7 \times 8$

$70 > 56$

$\therefore \frac{7}{8} > \frac{7}{10}$

(c) $20 \times 30 = 50 \times 4$

60×200

$\frac{20}{50} > \frac{4}{30}$

(d) $2 \times 33 = 13 \times 19$

$46 < 247$

$\frac{2}{19} < \frac{13}{23}$

3. (a) $\frac{-40}{100} = \frac{40 \div 40}{160 \div 40} = \frac{-1}{4}$

(b) $\frac{39}{65} = \frac{39 \div 13}{65 \div 13} = \frac{3}{5}$

(c) $\frac{15}{45} = \frac{15 \div 15}{45 \div 15} = \frac{1}{3}$

(d) $\frac{-36}{48} = \frac{-36 \div 12}{48 \div 12} = \frac{-3}{4}$

(e) $\frac{-125}{25} = \frac{-125 \div 25}{25 \div 25} = \frac{-5}{1}$

(f) $\frac{225 \div 5}{235 \div 5} = \frac{45}{47}$

4. (a) 7

(b) $\frac{36}{48}$

5. (a) $\frac{5}{12} + \frac{3}{4}$

(LCM of 2 and 4 is 12)

$\frac{5 \times 1}{12 \times 1} = \frac{5}{12}$

$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$

$\frac{5}{12} + \frac{9}{12} = \frac{5 + 9}{12} = \frac{14}{12} = \frac{7}{6}$

(b) $\frac{7}{16} + \left(\frac{-5}{12}\right)$

LCM of 16 and 12 is 48

$\frac{7 \times 3}{16 \times 3} = \frac{21}{48}$

$\frac{-5 \times 4}{12 \times 4} = \frac{-20}{48}$

$\frac{21}{48} + \left(\frac{-20}{48}\right) = \frac{21 + (-20)}{48}$

$= \frac{21 - 20}{48} = \frac{1}{48}$

(c) $\left(\frac{-2}{15}\right) + \frac{9}{20}$

LCM of 15 and 20 is 60

$\frac{-2 \times 4}{15 \times 4} = \frac{-8}{60}, \frac{9 \times 3}{20 \times 3} = \frac{27}{60}$

$\frac{-8}{60} + \frac{27}{60} = \frac{-8 + 27}{60}$

$= \frac{19}{60}$

(d) $\frac{21}{30} + \left(\frac{-19}{10}\right)$

LCM of 30 and 10 is 30

$\frac{21 \times 1}{30 \times 1} = \frac{21}{30}$

$\frac{-19 \times 3}{10 \times 3} = \frac{-57}{30}$

$\frac{21}{30} + \left(\frac{-57}{30}\right) = \frac{21 + (-57)}{30}$

$= \frac{21 - 57}{30} = \frac{-36}{30}$

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

(e) $\frac{7}{16} + \frac{7}{12}$

(LCM of 16 and 12 is 48)

$\frac{7 \times 3}{16 \times 3} = \frac{21}{48}$

$\frac{7 \times 3}{16 \times 3} = \frac{28}{48}$

$\frac{21}{48} + \frac{28}{48} = \frac{21 + 28}{48}$

$= \frac{49}{48}$

$\left(\frac{-3}{32}\right) + \left(\frac{-11}{24}\right)$

LCM of 32 and 24 is 96

$\frac{-3 \times 3}{32 \times 3} = \frac{-9}{96}$

$\frac{-11 \times 4}{24 \times 4} = \frac{-44}{96}$

$\frac{-9}{96} + \left(\frac{-44}{96}\right)$

$= \frac{-9 + (-44)}{96}$

$= \frac{-9 - 44}{96}$

$= \frac{-53}{96}$

6. (a) $\frac{10}{9} - \frac{7}{9} = \frac{10 - 7}{9} = \frac{3}{9} = \frac{1}{3}$

(d) $\frac{7}{20} - \left(\frac{-9}{30}\right)$ (Additive inverse of $\frac{-9}{20}$ is $\frac{9}{20}$

$\frac{7}{20} + \frac{9}{30}$ (LCM of 20 and 30 is 60)

$\frac{7 \times 3}{20 \times 3} = \frac{21}{60}$

$\frac{9 \times 2}{30 \times 2} = \frac{18}{60}$

$\frac{21}{60} + \frac{18}{60} = \frac{21 + 18}{60} = \frac{39}{60} = \frac{13}{20}$

(c) $\frac{-19}{20} - \left(\frac{-11}{20}\right)$ (Additive inverse of $\frac{-11}{20}$ is $\frac{11}{20}$)

$\frac{-19}{20} + \frac{11}{20}$

$= \frac{-19 + 11}{20} = \frac{-8}{20} = \frac{-2}{5}$

(Additive inverse of $\frac{-11}{20}$ is $\frac{11}{20}$

$\frac{-19}{20} + \frac{11}{20}$

$\frac{-19 + 11}{20} = \frac{-8}{20} = \frac{-2}{5}$

(d) $\frac{7}{20} \times \frac{-1}{2} = \frac{70 \times 1}{20 \times 2} = \frac{-70}{40} = \frac{-35}{20}$

$\frac{91}{100} - \frac{21}{20}$ (LCM of 100 and 120 is 100)

$\frac{91 \times 1}{100 \times 1} = \frac{91}{100}$

$\frac{91}{100} - \frac{105}{100} = \frac{91 - 105}{100} = \frac{14}{100} = \frac{7}{50}$

7. (a) $\frac{12}{11} \times \frac{2}{3} = \frac{12 \times 2}{11 \times 3} = \frac{24}{33} = 1\frac{8}{11}$

(b) $\frac{7}{20} \times \frac{-1}{2} = \frac{70 \times 4}{20 \times 2} = \frac{-70}{40} = \frac{-35}{20}$

(c) $\frac{3}{5} \times \frac{0}{5} = \frac{3 \times 0}{5 \times 5} = \frac{0}{25} = 0$

8. (a) $\frac{5}{11} \div \frac{15}{33} = \frac{5}{11} \times \frac{33}{15} = \frac{5 \times 33}{11 \times 15}$

(b) $\frac{25}{32} \div \frac{65}{48} = \frac{25}{32} \times \frac{48}{65} = \frac{25 \times 48}{32 \times 65} = \frac{11200 \div 25}{2275 \div 25} = \frac{48}{91}$

(c) $3\frac{1}{7} \div \frac{11}{12} = \frac{22}{7} \div \frac{11}{12} = \frac{22}{7} \times \frac{12}{7} = \frac{22 \times 12}{7 \times 7} = \frac{364}{49}$

(d) $\left(\frac{-85}{9}\right) \div \frac{34}{7} = \frac{-85}{9} \times \frac{7}{34}$

$= \frac{-85 \times 7}{9 \times 34} = \frac{-595}{306}$

9. (a) $\frac{-3}{2} = \frac{-3 \times 2}{2 \times 2} = \frac{-6}{4}$

$\frac{-3 \times 3}{2 \times 3} = \frac{-9}{6}$ $\frac{-3 \times 4}{2 \times 4} = \frac{-12}{8}$

$\frac{-3 \times 4}{2 \times 4} = \frac{-12}{8}$

(b) $-1 = -1 \times 2 = 2$

$-1 \times 3 = -3$

$-1 \times 4 = 4$

(c) $2 = 2 \times 2 = 4$

$2 \times 3 = 6$

$2 \times 4 = 8$

(d) $\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$

$\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$

$\frac{3 \times 4}{4 \times 4} = \frac{12}{16}$

(e) $\frac{-5}{4} = \frac{-5 \times 2}{5 \times 42} = \frac{-10}{8}$

$\frac{-5 \times 3}{4 \times 3} = \frac{15}{12}$

$\frac{-5 \times 4}{4 \times 4} = \frac{-20}{16}$

(f) $-2 = -2 \times 2 = -4$

$-2 \times 3 = -6$

$-2 \times 4 = -8$

(g) $\frac{3}{7} = \frac{3 \times 2}{7 \times 2} = \frac{6}{14}$

$\frac{3 \times 3}{7 \times 3} = \frac{9}{21}$

$\frac{3 \times 4}{7 \times 4} = \frac{12}{28}$

(h) $\frac{-7}{8} = \frac{-7 \times 2}{8 \times 2} = \frac{-14}{16}$

$\frac{-7 \times 3}{8 \times 3} = \frac{-21}{24}$, $\frac{-7 \times 4}{8 \times 4} = \frac{-28}{32}$

10. (a) $\frac{-5}{4} = -1.5$

$$\begin{array}{r} 1.5 \\ 2\overline{)\,30} \\ -\,2 \\ \hline 10 \\ -\,10 \\ \hline 0 \end{array}$$

(b) $2\frac{1}{20} = \frac{41}{20} = 2.05$

$$\begin{array}{r} 2.05 \\ 20\overline{)\,41} \\ -\,40 \\ \hline 100 \\ -\,100 \\ \hline 0 \end{array}$$

(c) $\frac{15}{7} = 2.14$

$$\begin{array}{r} 2.14 \\ 7\overline{)\,15} \\ -\,14 \\ \hline 10 \\ -\,7 \\ \hline 30 \\ -\,28 \\ \hline 2 \end{array}$$

(d) $\frac{7}{30} = 0.233$

$$\begin{array}{r} 0.23333 \\ 30\overline{)\,70} \\ -\,60 \\ \hline 100 \\ -\,90 \\ \hline 100 \\ -\,90 \\ \hline 100 \\ -\,90 \\ \hline 10 \end{array}$$

(e) $3\frac{1}{2} = 3.5 = \frac{7}{2}$

$$\begin{array}{r} 3.5 \\ 2\overline{)\,7} \\ -\,6 \\ \hline 10 \\ -\,10 \\ \hline 0 \end{array}$$

(f) $2\frac{6}{7} = \frac{20}{7} = 2.857$

$$\begin{array}{r} 2.857 \\ 7\overline{)\,20} \\ -\,14 \\ \hline 60 \\ -\,56 \\ \hline 40 \\ -\,35 \\ \hline 50 \\ -\,49 \\ \hline 10 \end{array}$$

(g) $3\frac{4}{9} = \frac{31}{9}$

$$\begin{array}{r} 3.44 \\ 9\overline{)\,31} \\ -\,27 \\ \hline 40 \\ -\,36 \\ \hline 40 \\ -\,36 \\ \hline 4 \end{array}$$

(h) $\frac{31}{20} = 1.33$

$$\begin{array}{r} 1.33 \\ 21\overline{)\,30} \\ -\,21 \\ \hline 90 \\ -\,36 \\ \hline 70 \\ -\,63 \\ \hline 7 \end{array}$$

11. (a) $\frac{1}{2}$ and $\frac{1}{4}$

$\frac{1}{2} = \frac{1 \times 8}{2 \times 8} = \frac{8}{16}$, $\frac{1 \times 4}{4 \times 4} = \frac{4}{16}$

3 rational number between $\frac{1}{2}$ and $\frac{1}{4}$ are $\frac{5}{16}$, $\frac{6}{16}$, $\frac{7}{16}$

(b) $\frac{1}{3}$ and $\frac{1}{5}$

$\frac{1}{3} = \frac{1 \times 10}{3 \times 10} = \frac{10}{30}$, $\frac{1 \times 10}{5 \times 10} = \frac{10}{50}$

3 rational number between $\frac{10}{30}$ and $\frac{10}{50}$ are $\frac{10}{31}$, $\frac{10}{32}$ and $\frac{10}{33}$

(c) 4 and 5

$4 \times \frac{4}{4} = \frac{16}{4}$, $5 \times \frac{4}{4} = \frac{20}{4}$

3 rational number between and 5 are $\frac{17}{4}$, $\frac{18}{4}$ and $\frac{19}{4}$

12. Weight of first packet: $2\frac{2}{7}$kg $= \frac{16}{7}$kg

Weight of second packet: $3\frac{1}{4}$kg $= \frac{13}{4}$kg

Weight of both of then together: $(\frac{16}{7} + \frac{13}{7})$ kg (LCM of 7 & 4 is 28)

$\frac{16 \times 4}{7 \times 4} = \frac{64}{28}$, $\frac{13 \times 7}{4 \times 7} = \frac{91}{28} = \frac{64}{28} + \frac{91}{28} = \frac{64 + 91}{28} = \frac{155}{28} = 5\frac{15}{28}$

Hence, weight of both the packets together is $5\frac{15}{28}$kg

13. Number of friends: 3

Weight of bag mangoes: $15\frac{9}{10}$kg $= \frac{159}{10}$kg

Quantity of mangoes each one got $= \frac{159}{10} \div 3$

$= \frac{159}{10} \times \frac{1}{3} = \frac{159 \times 1}{10 \times 3} = \frac{159}{30} = 5.3$kg

Answer: Each one will get 5.3kg of Mangoes.

4. Total part of Pocket money spent: $\frac{3}{4}$

Part of Pocekt money spent on movie: $\frac{1}{3}$

Part of Pocket money spent on books: $\frac{1}{6}$

Part of Pocket money spent on dress = Total par of pocket money spent – (Part of Pocket money spent on movie and books

$= \frac{3}{4} - \left(\frac{1}{3} + \frac{1}{6}\right) = \frac{3}{4} - \left(\frac{2+1}{6}\right) = \frac{3}{4} - \frac{3}{6}$

LCM of 4 and 6 is 24 $\frac{3 \times 6}{4 \times 6} = \frac{18}{24}$, $\frac{3 \times 4}{6 \times 4} = \frac{12}{24}$

$\frac{18}{24} = \frac{12}{24} = \frac{18 - 12}{24} = \frac{6}{24} = \frac{1}{4}$

Therefore, Aryan spent $\frac{1}{4}$ of his pocket money on dress.

15. Milk given by first cow: $5\frac{1}{2}l = \frac{11}{2}l$

Milk given by Second cow: $8\frac{5}{8}l = \frac{69}{8}l$

More given by Second cow in Compared to first cow: $\left(\frac{69}{8} - \frac{11}{2}\right)$l (LCM of 8 and 2 is 8)

$\frac{69 \times 1}{8 \times 1} = \frac{69}{8}$, $\frac{11 \times 4}{2 \times 4} = \frac{44}{8} = \frac{69}{8} - \frac{44}{8} = \frac{69 - 44}{8} = \frac{25}{8}l$

Hence, Second cow gave $\frac{25}{8}l$ more mil than first cow.

Multiple Choice Question

1. (a) Rational number

2. (c) a rational number

3. $\frac{0}{1} = 0$ (b) 0

4. (d) non determinable

5. (d) non–determinable

6. $2.625 = \frac{2625}{1000}$

$= \frac{2625 \div 125}{1000 \div 125} = \frac{21}{8}$

(c) $\frac{21}{8}$

7. (d) 1.352

8. $\frac{0}{x} = 0$

(Division of any number with 0 is always)

$0 - 0 = 0$

(c) 0

9. Sum of 2 numbers = –10

One number = $\frac{-2}{3}$ (Additive inverse of $\frac{-2}{3}$ is $\frac{2}{2}$)

$\frac{-10 \times 3}{1 \times 3} = \frac{-30}{3}$, $\frac{2 \times 1}{3 \times 1} = \frac{2}{3} = \frac{-30 + 2}{3} = \frac{-28}{3}$

10. $-5 + 5 = 0$

(a) 5

11. $\frac{7}{-8} = \frac{-7}{8} = \frac{-7 \times 8}{8 \times 8} = \frac{-56}{64}$

$\frac{-56}{64} \neq \frac{-56}{-64}$

(c) $\frac{-56}{-64}$

12. $0 \div \left(\frac{15}{-16}\right) = 0$ (Division of any number by 0 is always 0)

13. $\frac{15}{-17} + \frac{-23}{17} = \frac{-15}{17} + \left(\frac{-23}{17}\right)$

$= \frac{-15 + (-23)}{17} = \frac{-15 - 23}{17} = \frac{-38}{17}$

(c) $\frac{-38}{17}$

14. Reciprocal of $\left(\frac{-3}{-8}\right) = \frac{8}{-3}$ (a) $\frac{-8}{3}$

15. $\frac{22}{7}$ = 3.142857 (d) 3.142857

```
3.142857
30)22
 -21
  10
  -7
  30
 -28
  20
 -14
  00
 -56
  40
 -35
  50
 -49
   1
```

Check your Progress

1. $\frac{\not{-}7}{\not{-}11} = \frac{7}{11}$: Yes $\frac{-7}{-11}$ is a true number.

2. $\frac{-11}{32}, \frac{-7}{12}$

3. $\frac{-2}{7} = \frac{-2 \times 2}{7 \times 2} = \frac{-4}{14}$

$\frac{-2 \times 3}{7 \times 3} = \frac{-6}{21}$

$\frac{-2 \times 4}{7 \times 4} = \frac{-8}{28}$

4. $\frac{1}{4} + \frac{1}{3}$ (LCM of 4 and 3 is 12)

$\frac{1 \times 3}{4 \times 3} = \frac{3}{12}$

$\frac{1 \times 4}{3 \times 4} = \frac{4}{12} = \frac{3}{12} + \frac{4}{12} = \frac{3+4}{12} = \frac{7}{12}$

5. $\frac{3}{4} \times \frac{-4}{5} = \frac{3 \times -4}{4 \times 5} = \frac{-12}{20} = \frac{-6}{10} = \frac{-3}{5}$

6. Sum of $\frac{1}{2}$ and $\frac{1}{4} = \frac{1}{2} + \frac{1}{4}$ (LCM of 2 and 4 is 4)

$\frac{1 \times 2}{2 \times 2} = \frac{2}{4}, \frac{1 \times 1}{4 \times 1} = \frac{1}{4}$

$\frac{2}{4} + \frac{1}{4} = \frac{2+1}{4} = \frac{3}{4}$

$1 - \frac{3}{4} = \frac{1}{1} - \frac{3}{4} = \frac{1-3}{4} = \frac{-2}{4} = \frac{-1}{2}$

7. $\frac{1}{2} = 0.5$

$$2\overline{)10}\ 0.5$$
$$-10$$
$$0$$

8. $\frac{135}{100} = 1.35$

Two zeroes means deciam point will move 2 palce towards left

9.

$$20\overline{)70}\ 0.35$$
$$-60$$
$$100$$
$$-100$$
$$0$$

$\frac{7}{20} = 0.35$

Hence, $\frac{7}{20}$ is a terminating decimal.

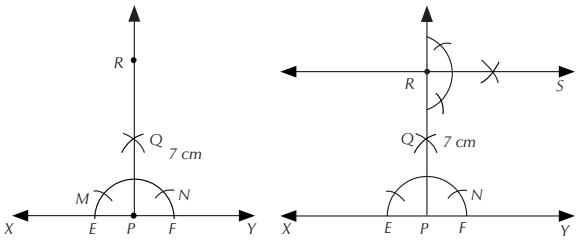
10. No 1.2727272 is not a ra tional number as it is a non – terminating decimal number.

10 Practical Geometry

Exercise 10.1

1.

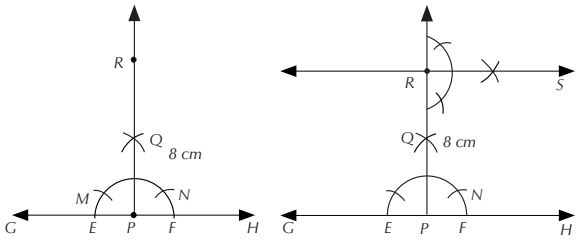
(a)



1. Draw a line XY and mark a point P at the middle of this line. With point P as the centre draw an arc that cut the line XY at the point E and F.
2. With the same radius of arc EF cut the arc EF at the point N from the point F.
3. Again from the point E as the centre cut the arc EF at M.
4. With the same radius cut the arc from the point M and N that met the point Q.
5. Now draw a line between points P and A And extend the line upward. So the □APY = 90°
6. Mark a point at the line PA from the point P with 7 cm of distance.
7. To draw a parallel line along with line AB , draw an arc from the point R as the centre and make 90° of angle from the point R, as made the ∠APY = 90°
8. Now the line AB and XY will be parallel and the distance between the both lines will remain 7cm everywhere.

   AB II XY

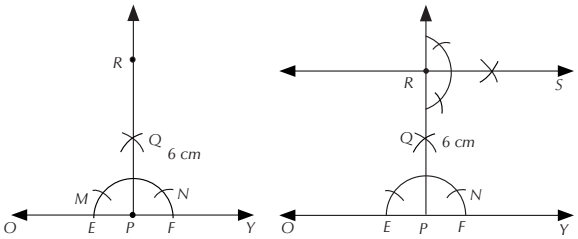
(b)



1. Draw a line GH and mark a point P at the middle of this line. With point P as the centre draw an arc that cut the line GH at the point E and F.
2. With the same radius of arc EF cut the arc EF at the point N from the point F.
3. Again from the point E as the centre cut the arc EF at M.
4. With the same radius cut the arc from the point M and N that met the point Q.
5. Now draw a line between points P and A And extend the line upward. So the □APH = 90°
6. Mark a point at the line PA from the point P with 8 cm of distance.
7. To draw a parallel line along with line AB , draw an arc from the point R as the centre and make 90° of angle from the point R, as made the ∠APH = 90°
8. Now the line AB and GH will be parallel and the distance between the both lines will remain 8 cm everywhere.

   AB II GH

(c)



1. Draw a line OY and mark a point P at the middle of this line. With point P as the centre draw an arc that cut the line OY at the point E and F.

2.With the same radius of arc EF cut the arc EF at the point N from the point F.

3. Again from the point E as the centre cut the arc EF at M.

4. With the same radius cut the arc from the point M and N that met the point Q.

5. Now draw a line between points P and O And extend the line upward. So the □APY = 90°

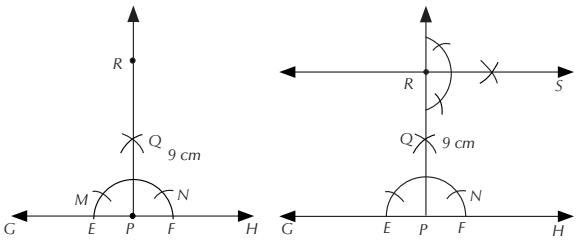
6. Mark a point at the line PA from the point P with 6 cm of distance.

7. To draw a parallel line along with line AB , draw an arc from the point R as the centre and make 90° of angle from the point R, as made the ∠APY = 90°

8. Now the line AB and OY will be parallel and the distance between the both lines will remain 6 cm everywhere.

AB II OY

(d)



1. Draw a line GH and mark a point P at the middle of this line. With point P as the centre draw an arc that cut the line GH at the point E and F.

2. With the same radius of arc EF cut the arc EF at the point N from the point F.

3. Again from the point E as the centre cut the arc EF at M.

4. With the same radius cut the arc from the point M and N that met the point Q.

5. Now draw a line between points P and A And extend the line upward. So the □APH = 90°

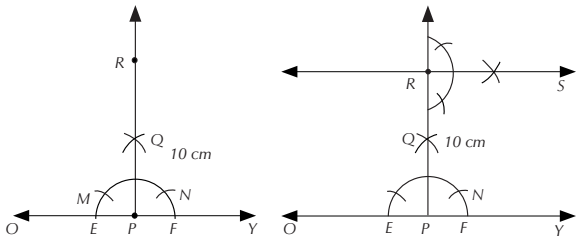
6. Mark a point at the line PA from the point P with 9 cm of distance.

7. To draw a parallel line along with line AB , draw an arc from the point R as the centre and make 90° of angle from the point R, as made the ∠APH = 90°

8. Now the line AB and GH will be parallel and the distance between the both lines will remain 9cm everywhere.

AB II GH

(e)



1. Draw a line OY and mark a point P at the middle of this line. With point P as the centre draw an arc that cut the line OY at the point E and F.

2. With the same radius of arc EF cut the arc EF at the point N from the point F.

3. Again from the point E as the centre cut the arc EF at M.

4. With the same radius cut the arc from the point M and N that met the point Q.

5. Now draw a line between points P and O And extend the line upward. So the ∠APY = 90°

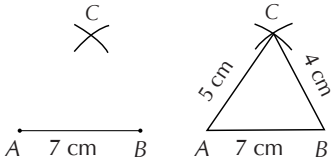
6. Mark a point at the line PA from the point P with 10 cm of distance.

7. To draw a parallel line along with line AB , draw an arc from the point R as the centre and make 90° of angle from the point R, as made the ∠APY = 90°

8. Now the line AB and OY will be parallel and the distance between the both lines will remain 10 cm everywhere.

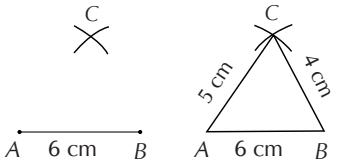
AB II OY

2. (a)



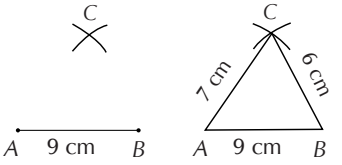
1. Draw a line AB having length 7cm
2. Make the compass and set it to a length of 5 cm and draw an arc from the point of A.
3. Again set the compass according to the length of third side of triangle as 4 cm. And draw an arc from the point B.
4. Draw arcs from the points A and B meet on point C. Then connect the point C to points A and B. Now ABC is a required triangle with sides length AB = 7 cm, AC = 5 cm and BC = 4 cm

(b)



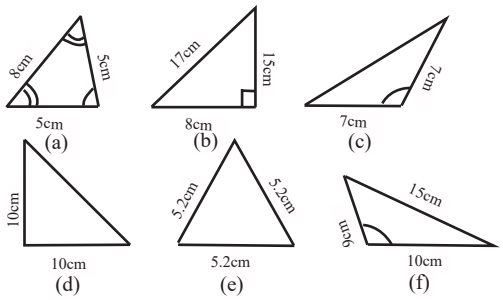
1. Draw a line AB having length 6 cm
2. Make the compass and set it to a length of 5 cm and draw an arc from the point of A.
3. Again set the compass according to the length of third side of triangle as 4 cm. And draw an arc from the point B.
4. Draw arcs from the points A and B meet on point C. Then connect the point C to points A and B. Now ABC is a required triangle with sides length AB = 6 cm, AC = 5 cm and BC = 4 cm

(c)



1. Draw a line AB having length 9 cm
2. Make the compass and set it to a length of 7 cm and draw an arc from the point of A..
3. Again set the compass according to the length of third side of triangle as 6 cm. And draw an arc from the point B.
4. Draw arcs from the points A and B meet on point C. Then connect the point C to points A and B. Now ABC is a required triangle with sides length AB = 9 cm, AC = 7 cm and BC = 6 cm

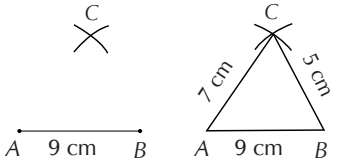
3.



4. b,c,e,g and i are the only triangles that can be constructed as their sum of any two shorter sides greater than the third side

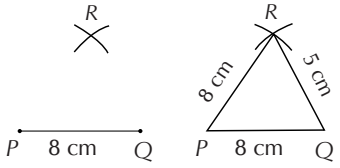
5. Opposite angle of the largest side of the triangle is greater.

6.



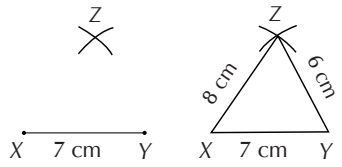
1. Draw a line AB having length 9 cm
2. Make the compass and set it to a length of 7 cm and draw an arc from the point of A..
3. Again set the compass according to the length of third side of triangle as 5 cm. And draw an arc from the point B.
4. Draw arcs from the points A and B meet on point C. Then connect the point C to points A and B. Now ABC is a required triangle with sides length AB = 9 cm, AC = 7 cm and BC = 5 cm

(b)



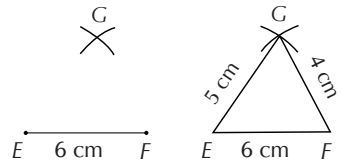
1. Draw a line PQ having length 8 cm
2. Make the compass and set it to a length of 8 cm and draw an arc from the point of P.
3. Again set the compass according to the length of third side of triangle as 5 cm. And draw an arc from the point Q.
4. Draw arcs from the points P and Q meet on point R. Then connect the point R to points P and Q. Now PQR is a required triangle with sides length PQ= 8 cm, PR = 8 cm and QR= 5 cm

(c)



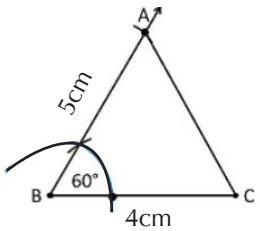
1. Draw a line XY having length 7 cm
2. Make the compass and set it to a length of 8 cm and draw an arc from the point of X..
3. Again set the compass according to the length of third side of triangle as 6 cm. And draw an arc from the point Y.
4. Draw arcs from the points X and Y meet on point Z. Then connect the point Z to points X and Y. Now XYZ is a required triangle with sides length XY= 7cm,XZ = 8 cm and YZ= 6 cm

(d)



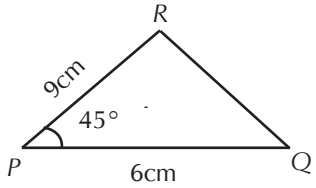
1. Draw a line EF having length 6 cm
2. Make the compass and set it to a length of 4 cm and draw an arc from the point of E.
3. Again set the compass according to the length of third side of triangle as 9 cm. And draw an arc from the point F.
4. Draw arcs from the points E and F meet on point G. Then connect the point G to points E and F. Now EFG is a required triangle with sides length EF= 6 cm, EG= 5 cm and FG= 4 cm

7. (a)



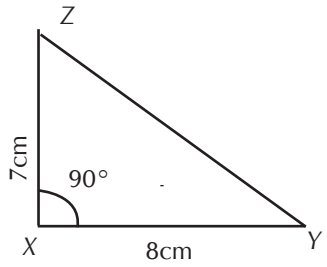
1. Draw BC of length 4 cm
2. Draw ∠ B =60°
3. Taking B as centre, 5cm as radius, we draw an arc. Let the point where arc intersects the ray be point A
4. Join AC
5. ΔABC is the required triangle

(b)



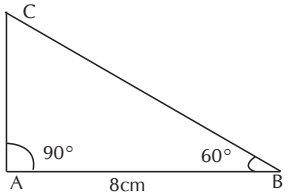
1. Draw PQ of length 6 cm
2. Draw ∠ P =45°
3. Taking P as centre, 9cm as radius, we draw an arc. Let the point where arc intersects the ray be point Q
4. Join QR
5. ΔPQR is the required triangle

(c)



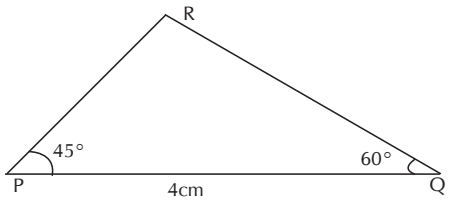
1. Draw XY of length 8 cm
2. Draw ∠ X =90°
3. Taking P as centre, 7cm as radius, we draw an arc. Let the point where arc intersects the ray be point Y
4. Join YZ
5. ΔXYZ is the required triangle

8. (a)



1. Draw a line AB = 8 cm.
2. Using compass construct an angle 90°at the point A.
3. Again using compass construct an angle 60° at the point B. Both extended line meet at point C.
4. Connect the point C to points A and B. Now ABC is a required triangle.

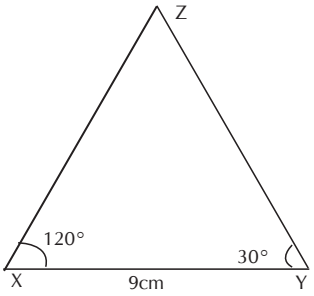
(b)



1. Draw a line PQ = 4 cm.
2. Using compass construct an angle 45°at the point P.
3. Again using compass construct an angle 60° at the point Q both extended line meet at point R.
4. Connect the point R to points P and Q.

Now PQR is a required triangle.

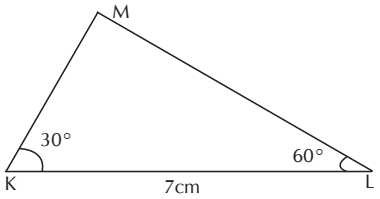
(c)



1. Draw a line XY = 9 cm.
2. Using compass construct an angle 120°at the point X.
3. Again using compass construct an angle 30° at the point Y. Both extended line meet at point Z.
4. Connect the point Z to points X and Y.

Now XYZ is a required triangle.

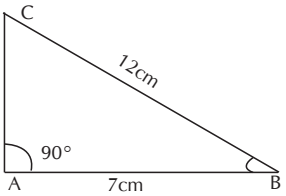
(d)



1. Draw a line KL= 7 cm.
2. Using compass construct an angle 30°at the point K.
3. Again using compass construct an angle 60° at the point L. Both extended line meet at point M.
4. Connect the –point M to points K and L.

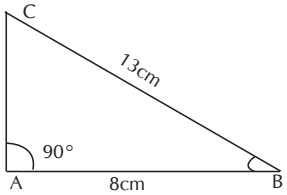
Now KLM is a required triangle.

9. (a)



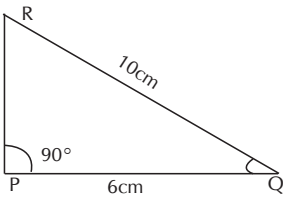
1. Draw a line segment AB of length 7 cm.
2. At A, draw AX perpendicular AB.
3. With B as the center, draw an arc of radius 12cm which should intersect AX at point C.
4. Join B and C.
5. ΔABC is the required triangle.

(b)



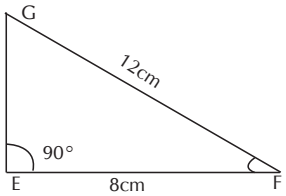
1. Draw a line segment AB of length 8 cm.
2. At A, draw AX perpendicular AB.
3. With B as the center, draw an arc of radius 13cm which should intersect AX at point C.
4. Join B and C.
5. ΔABC is the required triangle.

(c)



1. Draw a line segment PQ of length 6 cm
2. At P, draw PX perpendicular PQ.
3. With Q as the center, draw an arc of radius 10cm which should intersect PX at point R.
4. Join Q and R.
5. ΔPQR is the required triangle.

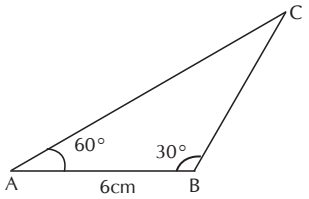
(d)



1. Draw a line segment EF of length 8 cm.
2. At G, draw EX perpendicular GF.

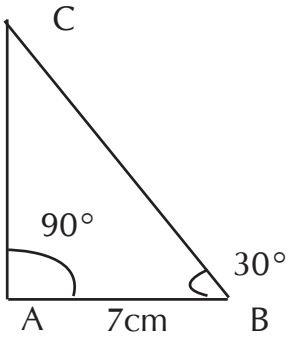
3. With F as the center, draw an arc of radius 12cm which should intersect GX at point F.
4. Join E and F.
5. ΔEFG is the required triangle.

10. (a)



1. Draw a line segment AB of length 6 cm.
2. At A, draw ray AY making 60° with AB.
3. At B, draw ray BX making 30° with AB.
4. Rays BX and AY will intersect at point C.
5 Triangle ABC is now constructed.

(b)



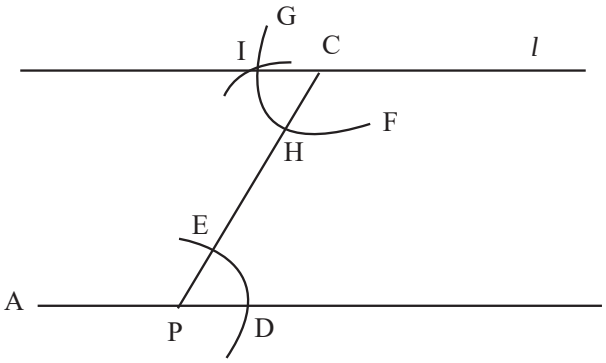
1. Draw a line segment AB of length 7 cm.
2. At A, draw ray AY making 60° with AB.
3. At B, draw ray BX making 30° with AB.
4. Rays BX and AY will intersect at point C.
5. Triangle ABC is now constructed.

(c) It cannot be drawn as sum of two angles is 180° (The sum of all internal angles of a triangle is always equal to 180°)

(d) It cannot be drawn as sum of two angles is more than 180° (The sum of all internal angles of a triangle is always equal to 180°)

(e) It cannot be drawn as sum of two angles is more than 180° (The sum of all internal angles of a triangle is always equal to 180°)

11. 1. Draw a line, AB of length 7 cm., take a point C outside this line. Take any point P on AB. Join C to P.
2. Taking P as a centre and a convenient radius, draw an arc intersecting line AB at D and PC at E.
3. Taking C as the centre and the same radius in the previous step, draw an arc FG intersecting PC at H.
4. Adjust the compass up to the length of DE. Without changing the opening of the compass and taking H as the centre, draw an arc to intersect arc HG at point I.
5. Join the point C and I to draw the line l as shown in the figure.
6. Thus, line l is parallel to line AB.



Check Your Progess

1. To contruct a triangle **three** sides are required.

2. One can construct a triangle when its **1 angle** and two sides are given.

3. To construct a triangle two angles and **1 side** are required.

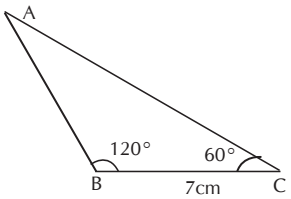
4. To Contruct a right-angled triangle, its hypotenuse and **side** one are required.

5. No, it is not possible to construct a triangle with lengths of its sides as 4 cm, 3 cm and 7 cm because here we see that sum of the lengths of two sides is equal to third side i.e., 4+3 = 7. As we know that, the sum of any two sides of a triangle is greater than its third side, so given statement is not correct.

6. **Answer:** 6.Side-Angle-Side

7. **Answer:** Angle-Side-Angle

8. Answer:



(a) Draw a line segment QR = 4 cm.

(b) At point Q, draw an angle of 110° with the help of protractor, i.e., $\angle$ YQR=110°

(c) Taking Q as centre, draw an arc with radius 6.5 cm, which cuts QY at point P.

(d) Join PR

It is the required isosceles triangle PQR

9. It cannot be drawn as sum of two angles is 180° (The sum of all internal angles of a triangle is always equal to 180°)

10. Equilateral

11 Perimeter and Area

Exercise 11.1

1. (a) Perimeter of Rectangle = 2(Length + Breadth)

= 2(12 + 7)cm

= 2(19)cm = 38cm

(b) Perimeter of Rectangle = 2(Length + Breadth)

= 2(15 + 9)cm

= 2(24) = 48cm

(c) Perimeter of Rectangle = 2(Length + Breadth)

= 2(25)cm = 50cm

(d) Perimeter of Rectangle = 2(Length + Breadth)

2(16.5 + 24.5)cm

= 2(41)cm = 82cm

(e) Perimeter of Rectangle = 2(Length + Breadth)

= 2(22 + 18)cm

= 2(40)cm = 80cm

2. (a) Perimeter of square = 4 × side

(4 × 8)cm

= 32cm

(b) Perimeter of square = 4 × side

= (4 × 12)cm

= 48cm

(c) Perimeter of square = 4 × side

= (4 × 9.4)cm

= 37.6cm

(d) Perimeter of square = 4 × side

= (4 × 17.5)cm

= 70.0cm

3. Given: Perimeter of Rectangle = Perimeter of square

2(Length + Breadth) = 11cm

Hence, Breadth of the rectangle is 11cm.

4. Perimeter of square 4 × Length of square

Length of square = $\frac{\text{Perimeter of Square}}{4}$ = $\frac{38}{4}$cm = 9.5cm

5. Perimeter of rectangular lawn = 2(22 + 17)cm = 2(39)cm = 78cm

Number of Shrubs required for 1m of hedge: 3

Number of shrubs required for 78m of hedge = 78 × 3 = 234

Hence, 234 shrubs are required for the rectangular lawn.

6. Perimeter of filed = 2(Length + Breadth)

= 2 (83 + 33)m = 2(116)m = 232m

Number of times Golu has to run around the field to ocve 812m

= $\frac{812}{232}$m = 3.5 times

Hence Golu has the rem arund the field 3.5 times in order to cover 812m.

7. Let the length be x

Breadth = 4 times length = 4 × Length

= 4 × x = 4x

Perimeter = 2(Length + Breadth)

48m = 2(x + 4x)

48 = 2(5x)

48 = 10x

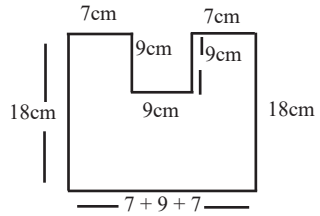
x = $\frac{48}{10}$, x = 4.8m

Length x = 4.8m

Breadth = x = 4x = 4 × 4.8 = 19.2m

Hence, its length and Breadth are 4.8m and 19.2m respectively.

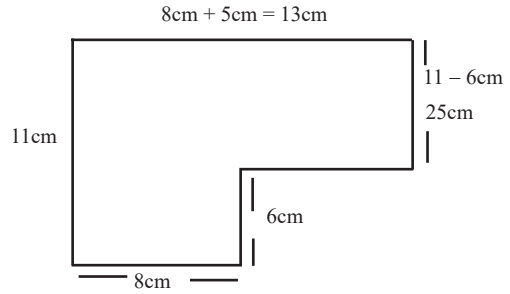
8. (a)



= (7 + 9 + 9 + 9 + 7 + 18 + 7 + 9 + 7 + 18) cm

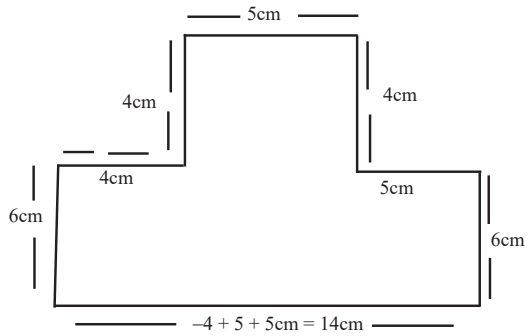
= 100cm

(b)



= (13 + 5 + 6 + 8 + 11)cm = 48cm

(c)



9. (a) Perimeter = Sum of all the sides

= (7 + 8 + 8)cm

= 23cm

(b) Perimeter = Sum of all the sides

= 4 + 4 + 3 + 6 + (4 + 3)cm

= (13 + 7)cm

= 20cm

(c) Perimeter = Sum of all the sides

(8 + 6 + 8 + 6)cm

= 28cm

(d) Perimeter = Sum of all the sides

= (2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2)cm

= (2 × 12)cm = 24cm

(e) Perimeter = Sum of all the sides

= (1 + 7 + 1 + 3 + 3 + 1 + 1 + 1 + 7 + 1) cm

= 26

(f) All sides are equal

Perimeter of triangle = 3 × 4

= 12cm

Number of triangles = 4

Perimeter of triangle = (4 × 12)cm

= 48cm

10. Let the adjacent sides be 17x and 7x respectively.

Second side = 7x, but second side = 3.5cm (given)

So, 7x cm = 3.5 cm

$x = \frac{3.5}{7}$

$= \frac{35}{7} \times 10$

$= \frac{5}{10}$

= 0.5

So, x = 0.5

So 1st side = 17x = 17 × 0.5 = 8.5 cm

2nd side = 7x = 7 × 0.5 = 3.5 cm (which is already given)

So, perimeter = 2 (l + b) = 2(8.5 + 3.5) cm

= 2(12)

= 24

11. Let the missing side be x

Other side: x + 2.5m

Perimeter = 51m

Perimeter of Parallelogram = 2(Length + Breadth)

51m = 2(x + 2.5m)

$\frac{51m}{2}$ = x + 2.5m

25.2m = x + 2.5m

x = (25.5 – 2.5)m

x = 23m

Hence, the length of the missing side is 23m.

Exercise 11.2

1. (a) Area of rectangle = Length × Breadth
= (15 × 8)cm
= 120cm^2

(b) Area of rectangle = Length × Breadth
= (12 × 7.5)cm
= 90cm^2

(c) Area of rectangle = Length × Breadth
= (18 × 25)cm
= 450cm^2

(d) Area of rectangle = Length × Breadth
= (14.6 × 22.4)cm
= 327.04cm^2

(e) Area of rectangle = Length × Breadth
= (16.4 × 24.6)cm
= 4.3.44cm^2

2. (a) Area of square = Side × Side
= (6 × 6)cm^2
= 36cm^2

(b) Area of square = Side × Side
= (12 × 12)cm^2
= 144cm^2

(c) Area of square = Side × Side
(9 × 9)cm^2
= 81cm^2

(d) Area of square = Side × Side
= (15.5 × 15.5)cm^2
= 240.25cm^2

3. (a) Area of triangle = $\frac{1}{2}$ × base × height
= $\frac{1}{2}$ × 12 × 12 = $\frac{1}{2}$ × 144cm
= 72cm

(b) Area of triangle = $\frac{1}{2}$ × base × height
= $\frac{1}{2}$ × 13 × 13
= $\frac{1}{2}$ × 169cm = 84.5cm

(c) Area of triangle = $\frac{1}{2}$ × base × height
= $\frac{1}{2}$ × 10 × 10
= $\frac{1}{2}$ × 100cm = 50cm

(d) Area of triangle = $\frac{1}{2}$ × base × height
= $\frac{1}{2}$ × 7 × 12
$\frac{1}{2}$ × 7 × 12
$\frac{1}{2}$ × 84cm
= 42cm

(e) Area of triangle = $\frac{1}{2}$ × base × height
= $\frac{1}{2}$ × 6 × 8
= $\frac{1}{2}$ × 48cm
= 24cm^2

4. Area of Parallelogram = Base × Height
Base = 12.5cm, Height = 8.5cm
Area = (12.5 × 8.5)cm^2 = 106.25cm^2

5. Area of rectagnular plot = Length × Breadth
350^2 = Length × 14m
Length = $\frac{350}{14}$
= 25m
Perimeter = 2 (Length + Breadth)
= 2(25 + 14)m
= 2(39m)m = 78m
Therefore, the Perimeter of the rectangle is 78m.

6. Area of rectangle = Area of square
Length × Breadth = Side × Side
25 × Breadth = (22 × 22)m
Breadth = $\frac{484}{25}$
Breadth = 19.36cm
Hence, the breadth of the rectangular ground is 19.36m.

7. Area of Parallelogram: Base × Height
85.5cm^2 = Base × 7.5cm
Base = $\frac{85.5}{7.5}$cm, Base = 11.4cm
Hence, the base of the parallelogram is 11.4cm

8. Area of triangle = $\frac{1}{2}$ × base × height
67 cm^2 = 4.5cm × hegith
67cm^2 = 4.5cm × height
Height = $\frac{67}{4.5}$ cm = 14.89cm

9. Perimeter of square = 4 × side

81cm = 4 × side

Side = $\frac{81}{4}$cm

Side = 22.5cm

Area of square = Side × Side

= (22.5 × 22.5)cm^2

= 506.25cm^2

10. Area of land: 5 hectares

Number of Sons: 4 × Sdies

Area of Land for each Son: $\frac{5}{4}$ hectare = 1.25 hectares

Hence, each son got 1.25 hectares land.

11. Let the sides be x

Area of traingle = $\frac{1}{2}$ × base × height

$72cm^2 = \frac{1}{2}\ \frac{1}{2}$ x × x

(72 × 2)cm = × x^2

144cm = x^2 = 12cm units

Hence, the length of side are 12cm.

12. Area of Parallelogram = Base × height

Height = Distance between two parallel lines

= 280m

Hence the base of the Parallelogram is 280m

13. Given that,

The perimeter of the parallelogram is 140m.

Its area is 210m2

Distance between a pair of opposite sides is 7m.

To find out,

Length of the two adjacent sides of the parallelogram, as shown in the figure above.

We know that, area of a parallelogam = side × its corresponding height

So, if a is the side, h will be its corresponding height.

Here, h = 7m

Hence, a × h = 210

= a = $\frac{210}{7}$

= 30m

We also know that, perimeter of a parallelogram = 2(a + b)

Here, perimeter = 140m, a = 30m

Hence, 2(30 + b) = 140

= 60 + 2b = 140

= 2b = 80

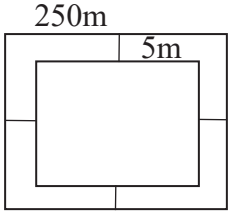
= b = 40m

Hence, the two adjacent sides of the parallelogram are 30m abd 40m.

Exercise 11.3

1. Area of square filed = Side × Side

= (250 × 250)m^2 = 62500m^2



Area of square filed not covered by road

= ((250 – 5) × (250 – 5)m^2

= (Area of road = (62500 – 60025)m^2

= 2475m^2

2. Area of park: (750 × 450)m^2

= 337500m^2

Area of Swimming leftover pool: (175 × 80) m^2

= 14000m^2

Area of left over Perimeter park = (337500 – 14000)m^2

= 3,23,500m^2

Cost of lanying grass per sqm = ₹15

Cost of lanying grass for 323500m^2 = ₹(15 ₹ 323500)

= ₹48,52,500

Hence, the cost of anying grass for left over part of the park is ₹48,52,500.

3. Length of field = 60m

Breadth of field = 25m

Area of filed: $60 \times 25 = 1500m^2$

Width of path = 2m

Inner length = 60 – (2 + 1)m = 56m

Inner Breadth = 25 – (2 + 2)m = 21m

Area of inner = Length × Breadth

$= (56 \times 21)m^2 = 1176m^2$

Area of path = Outer area – Inner area

$= (1500 - 1176)m^2 - 324m^2$

Cost of pacesing 1sqm = ₹15

Cost of pacesing 1176sqm = ₹(1176 × 15)

4. Area of building $= (80 \times 50)m^2$

$= 4000m^2$

Length of building (Length of building + 2 × Width) = (50 + 2 × 5)m

= 60m

Area of building include of Varandah = (90 × 60)m^2

$= 5400m^2$

Area of Varandha = $(5400 - 4000)m^2$

$= 1400m^2$

Area of 1 tile = $(40 \times 40)cm^2$

$= 1600cm^2$ ($km^2 = \frac{1}{10000}m^2$)

$= 1600cm^2 = \frac{1600}{10000}m^2$

$= 0.16m^2$

Number of tiles required = $\frac{\text{Area of Urandah}}{\text{Area of 1 tile}}$

$= \frac{1400}{0.16} = 25000$

5. $1cm = \frac{1}{100}$

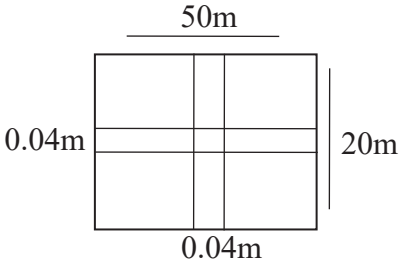
$4cm = \frac{4}{100}m = 0.04m$

Area of road along the length = (825 × 0.04)m

= 33m

Area of raod along the Bredth = (375 × 0.04)m

= 15m



Area of Small square = 0.04 × 0.04

= 0.0016m

Area of the whole path: 33m + 15m – 0.0016m

$= 47.9984m^2$

6. Length of the picture = Length of photoframe = 2 × width

= 75 – 2 × 2.5cm

= (75 – 5cm) = 70cm

Breadth of the picture = Breadth of photframe – 2 × width

= 40 – 2 × 2.5cm

= 40 – 5cm = 35cm

7. Area of zari = Area of rectangle (or san) - Area of rectangle (Withour zori)

Length of sarre: 5.7m = (5.7 × 100)cm = 140cm (1m = 100cm)

Breath of sarre: 1.4m (1.4 × 100)cm = 140cm (1m = 100cm)

Area of saree = Length × Breath = (570 × 140)cm2

Area of sarre = Length × Breath = (570 × 140)cm^2

Area of sarree without zari = Length × Breadth = $79800cm^2$

Breath: 140(37 + 37) = (140 – 7.4)cm = 132.6cm

Area of Saree = Length × Breadth = (570 × 140)cm^2

Area of saree without zon = Length × Breadth

= 537cm × 132.6cm

$= 71206.2cm^2$

So, area of zari = Area of rectangle (or zari) – Area of rectangle (without zori)

$= (79800 - 71206.6)cm^2 = 8593.40cm$

Exercise 11.4

1. Circumference of circle = $2\pi r$

(a) Radius = $\frac{\text{Diameter}}{2} = \frac{28}{2}$cm = 14cm

$2\pi r = 2 \times \frac{22}{7_1} \times \frac{14}{1}2 = 88$cm

(b) Cricumference of circle = $2\pi r$

Radius = $\frac{\text{Diameter}}{2} = \frac{21}{2}$cm

$2\pi r = 2 \times \frac{22^{11}}{7} \times \frac{21^{3}}{2} = 66$cm

(c) Cricumference of circle = $2\pi r$

Radius = $\frac{\text{Diameter}}{2} = \frac{4.2}{2}$cm = 2.1cm

$2\pi r = 2 \times \frac{22}{7_1} \times \frac{14}{1}2 = 88$cm

(d) Radius = $\frac{\text{Diameter}}{2} = \frac{4.9}{2}$mm

$2\pi r = \frac{2}{1} \times \frac{22}{7} \times \frac{4.9}{2} = 15.4$mm

2. (a) $2\pi r = 2 \times \frac{22}{7_1} \times \frac{35}{1}5$

= 220cm

(b) $2\pi r = \frac{22}{7} \times \frac{6.3}{1}^{0.9}$

= 39.6cm

(c) $2\pi r = 2 \times \frac{22}{7} \times \frac{2.8}{1}^{0.4}$

= 17.6mm

(d) $2\pi r = 2 \times \frac{22}{7} \times \frac{8.4}{1}^{1.2}$

= 52.8mm

3. (a) $2\pi r = 44$cm

$r = \frac{44}{2}2 \times \frac{7}{22}1$

r = 7cm

(b) $2\pi r = 31.5$cm

$r = \frac{31.5}{2} \times \frac{7}{22} = \frac{220.5}{44}$cm

r = 5.01cm

(c) $2\pi r = 126$mm

$r = \frac{126}{2}\,3 \times \frac{7}{22} = \frac{441}{22}$mm

= 20.04mm

4. Circumference = $2\pi r$

Radius = 9.8m

Circumference = $2 \times \frac{22}{7} \times 9.8^{1.4}$m

= (44 × 1.4)m = 61.6m

Hence the circumference of the pond is 61.6m.

5. Circumference of circular park = 396m

$2\pi r = 396$m

$2 \times \frac{22}{7} \times r = 396$

$r = \frac{396}{2}18^{9} \times \frac{7}{22}$, r = 63m

Diameter = 2 × radius = 2 × 63m

= 126m

6. Circumference of circular field × Cost per meter = Total cost for fencing

$2\pi r \times 60 = 26400$, $2\pi r = \frac{26400}{60}$

$2\pi r = 440$m

$r = \frac{440}{1\,2}18^{10} \times \frac{7}{22}1$, r = 70m

7. Distance = Circumference of circular garden

= $2\pi r$ [Radius = $\frac{\text{Diameter}}{2} = \frac{105}{2}$m = 52.5m]

$= 2 \times \frac{22}{7} \times \frac{52}{1}^{5} = 330$m

Time required to walk around the field

$= \frac{\text{Distance}}{\text{Speed}} = \frac{330}{18} = 18.32$ (Apprex)

Hence, 18 minutes 32 second will be = 18 minutes 32 seconds required to cover a circular garden of 105m at the rate of 18m per minute.

8. The wire is in the shape of rectangle

Length = 40cm

Breadth = 11cm

Now, the wire is molded into a circle from a rectagle So, Perimeter of rectangle = Circumference of circle

$2(l + b) = 2\pi r$

$2(40 + 11) = 2 \times \frac{22}{7} \times \pi = 2(51) = \frac{44}{7} \times r$

$r = \frac{7}{4a} \times 102 = r = \frac{714}{44} = 16.23$m (Approx)

Area of the circle = $\pi r2\frac{22}{7} \times 16.23 \times 16.23$

$= 827.86\text{m}^2$

9. (a) Diameter of circle = Side of squre

Area of circle = πr^2 (radius = $\frac{D}{2} = \frac{4^2}{2} = 21$

$= \frac{22}{7} \times 21 \times = 138.6\text{cm}^2$

Area of shaded part = $\frac{1}{2}$ area of circle

(Diameter divides the circle into 2 equal parts

$= \frac{1}{2} \times 1386\text{cm}^2 = 693\text{cm}^2$

(b) Area of shaded part

$= \frac{1}{4}\pi r^2 + \frac{3}{4}\pi r,^2$

$= \frac{1}{4}\pi \times (3.5)^2 + \frac{3}{4}\pi \times (3.5)^2$

$= \frac{1}{4} \times \pi \times (3.5)^2 (1 + 3)$

$\frac{1}{\cancel{4}^1} \times \pi \times (3.5)^2 \times \cancel{4}^1$

$(3.5)^2 \times \frac{22}{7}$

$= 12.25 \times \frac{22}{7}$

$= 1.75 \times 22 = 38.5m^2$

(c) Radius $= \frac{1}{2}$ of diameter

$= \frac{1}{2} \times 7m = 3.5m$

Area of shaded part $= \frac{1}{2} \times$ Area of cricle (Diameter divides the circle into 2 equal parts)

$= \frac{1}{2} \times \pi r^2 = \frac{1}{\cancel{2}^1} \times {}_2\frac{\cancel{22}}{\cancel{7}} {}^{11} \times \cancel{3.5}^1 \times 3.5$

$= \frac{38.5}{2} m^2 = 19.25m^2$

(d) Radius of circle = Side of square

Area of shaded part $= \frac{1}{4}$ of area of circle

$= \frac{1}{4} \times \pi r^2 = \frac{1}{\cancel{4}^2} \times \frac{\cancel{22}}{7}^{11} \times 15 \times 15$

$= \frac{2475}{1.4} = 176.758cm^2$

10. Area of plate $= \pi r^2 - \pi r,^2$

$\pi \times 7 \times 7 - \pi \times 1.5 \times 1.5$

$= \pi \times 49 - \pi \times 25$

$= \pi(49 - 2.25)$

$= \pi(46.75)$

$= \frac{22}{7} \times 46.75 = 146.92m^2$

Hence, the area of plate is $146.92m^2$

11. Radius circular park $= \frac{\text{Diameter}}{2}$

$= \frac{1428}{2} m = 714m^2$

Area of land leftout = Area of circular park = Area of pond

$= \pi r^2 - \pi r^2,$

$= \pi(r^2 - x^2,)$

$= 3.14((714)^2 - (196)^2)$

$= 3.14\ (509796 - 38416)$

$= 3.14(471380)$

$= 1480233.2m^2$

12. Area of cross section = Area of outer radic - Area of inner radius

$= \pi(R + r)^1 (R - r)$

$= \pi(5 + 5)\ (6 - 5) = \pi(11) \times 1 = \pi \times 11$

$= 3.14 \times 11 = 34.54cm^2$

13. Area left for the audience = Area of circus tent- Area of ring at the centr

$= \pi R^2 - \pi r^2 = \pi(R^2 - r^2) = \pi(R + r)\ (R - r)$

$= 3.14(42 + 12)\ (42 - 12) = 3.14(54 + 30)$

$= 3.14(1620)m^2 = 5086.8m^2$

Review Exercise

1. 4hectare = 40,000sq.m (1 hectare = 10000sq.m)

Area of square $= (a)^2$

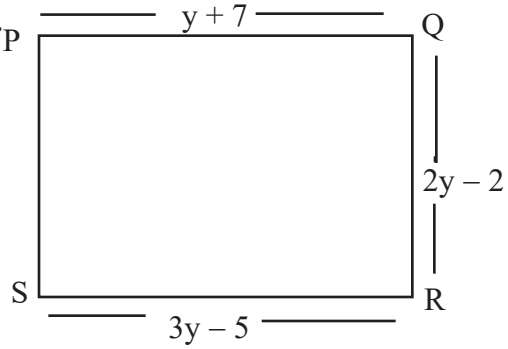
$a^2 = 4000m^2$, $a = 200m$

Perimeter of square = 4 × side = 4 × 200m = 800m

Total ust = (24 × 800)m = ₹19200

Cost for constructing a boundary around a 4 hectare square based farm is ₹19200

2.



In rectangle PQRS

PQ = SR (Opp sides or rectangle are equal)

$y + 7 = 3y - 5$

$y - 3y - 5 - 7$

$-2y = -12$

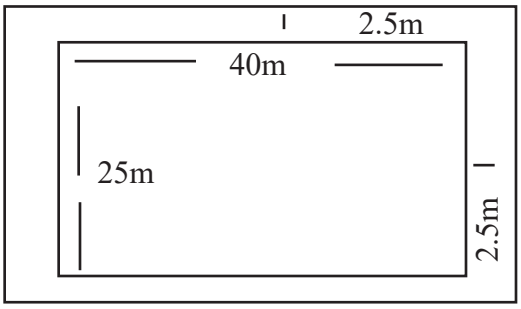
$y = 6$

$PQ = y + 7 = 6 + 7 = 13cm$

$QR = 2y - 2 = (2 \times 6) - 2$

$PQ = SR = 13cm$, $QR = PS = 10cm$

3. P Q



S R

Perimeter of rectangular fence = 2(L + B)

= 2(40 + 25)m = 2(65)m

= 130m

Length of fence + footpath = (40m + 2.5m + 2.5m)m = 45cm

Breadth of fence + footpath = (25 + 2.5 + 2.5)m = 30m

Area of outer rectangle PQRS = L × B (40 × 25)m^2 = 1000m^2

Area of inner footpath = Area of outer rectangle – Area of inner rectangle

= (1350 – 1000)m^2 = 350m^2

4. Length = 140cm

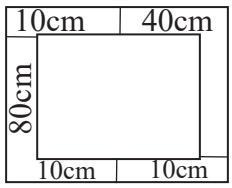
Breadth = 80cm

Length of framed painting = (140 + 10 + 10)cm

= 160cm

Breadth of framed painting = (80 + 10 + 10)cm

= 100cm



Area of hardboard required = (160 × 100)cm^2

= 16000cm^2

5. The cost of paving the tree paths is Rs 16,250

Step-by-step explanation:

We are given that,

The dimensions of the vertical rectangular path are 35 meters × 3 meters.

As, Area of a rectangle = Length × Width

So, Area of 2 vertical rectangular paths = 2 × 35 × 3 =210 m^2

Also, dimensions of the horizontal rectangular path are 55 meters × 3 meters.

So, Area of horizontal rectangular paths = 55 × 3 = 165 m^2

Thus, the total area of the paths = 210 + 165 = 375 m^2

Since, the cost of paving 1 square meter of path = Rs 65.

So, the cost of paving 70 square meter = 65 × 375 = Rs 24,375

Hence, the cost of paving the three paths is Rs 24,375.

7. Length of rectangular garden, L = 21 m

Breadth of rectangular garden, B = 17m

When 1.5m margin has been left

Length l = 21 − 1.5 − 1.5 = 18m

Breadth, b = 17 − 1.5 − 1.5 = 14m

Area of region where tuberoses has been planted = L × B − l × b

= 21 × 17 − 18 × 14=105m^2

Now, it given 3 tuberose are planted in 1 m^2

No. of tuberose are planted in 105 m^2

= 3 × 105 = 315

Hence, 315 tuberoses can be planted in the given area.

8. Circumference of wheel with radius 28cm = 0.28m

$= 2\pi r = 2 \times \frac{22}{7} \times 0.28^{0.04} = 1.76cm$

Number of revelution required to travel 704km $= \frac{704}{1.76} = 400$

Hence, 400 revolutions are required to cover a distance of 704m.

9. (a) Area pf shaded part = Area of (Outer circle – inner circles)

$= \pi R^2 - \pi r^2$

$= \pi(R^2 - r^2) = \pi(R + r)(R - r)$ (By using (a + b) (a – b))

$= \pi(4.9 + 3.5)(4.9 - 3.5) = \pi(8.4\ (1.4)$

$= \frac{22}{7} \times 11.76 = \frac{258.72}{7} = 36.96cm^2$

(b) Area of squre = $(a)^2$

$= (80)^2 = 6400cm^2$

Radius of cirlce = $\frac{1}{2}$ × Side = $\frac{1}{2}$ × 80cm = 40cm

Since, it forming 4, $\frac{1}{4}$ circles with similar radius we have 1 circle.

Area of shaded region = Area of square - Area of circle

$= 6400 - \pi r2$

$= 40 - \left(\frac{22}{7} \times 1600\right) = 6400 - 5028.57$

$= 1371.43m^2$

Multiple Choice Question

1. Circumferences = $2\pi r$

$= 2 \times \pi \times 3x^2 = 6\pi x^2$

Answer: (a) $6\pi x^2$

2. Circumferences = $2\pi r$, r = 7cm

$= 2 \times \frac{22}{7} \times 7 = 44cm$

Answer: (b) 44cm

3. Area of circle = $\pi r2$

$\pi \times (4 \times 3)^2$

$= \pi \times 16 \times 6$

$= 16\pi x^6$

Answer: (c) $16\pi x^6$

4. Circumference = $2\pi r$

$C = 2\pi^2 r$

$= 4\pi r = 2(2\pi r)$

Answer: (b) 2 times

5. Area of parallelogram

= base × height

$= (8 \times 6)cm^2$

$= 48cm^2$

Answer: (c) $48cm^2$

6. **Answer:** (d) none of these

7. Area of 11gm = b × h

$81 = b \times 9$

$h = \frac{81}{9}$, b = 9cm

Answer: (b) square, as Area = $(a)^2$

8. Area of magic = $\frac{1}{2}$ × b × h

Base = 2 × h = 2 × 2x = 4x

$= {}_1\cancel{\frac{1}{2}} \times 4x \times \cancel{2x} = 4x^2$

Answer: $4x^2$

9. Area of triangle = $\frac{1}{2}$ × b × h

$18x^2 = {}_1\cancel{\frac{1}{2}} \times b \times \cancel{6x}^{3x}$

$\frac{18x^2}{3x} = b$, b = 6x

Answer: (c) 6x

10. **Answer:** (c) 10, 000

11. Let the side of equilateral triangle be a.

Area of $\Delta = \frac{\sqrt{3a^2}}{4}$

$4\sqrt{3} = \frac{\sqrt{3a^2}}{4}$

a1 = 4 × 4

a = 4cm

Perimeter of $\Delta = 3\alpha$

= 3 × 4cm = 12cm

Answer: (a) 12cm

12. Let the ratio rectangle be x.

Let length = 3x

Let Breadth = 2x

P of Rectangle = 2(L + B)

= 2(2x + 3x) = 10x

Area of rectangle = L × B

$= 2x \times 3\pi = 6\pi^2$

Let are be 9x and let perimeter be 5x

13. Let the length of the rectangle be 3x

Breadth of the rectangle be 2x

Area of the rectagnle will be $6x^2$

Perimeter of rectangle is 2(L + B)

Perimeter = 10x

= 10x = 20

= x = 2

Length = 6cm and Breath = 4cm

Area of rectangle = $6x^2$

= Area = 6 × 4

Area = $24cm^2$

Answer: (a) $24cm^2$

14. Let the sides of the rectangle be 6xcm and 5xcm.

Perimeter of the rectangle = Circumference of circle

$= 2(6x + 5x) = 2 \times \frac{22}{7} \times 21$

$= 22x = 132$

$= x = 6$

The sides of the rectangle are 36cm and 30cm.

Area of the rectangle $= 36 \times 30 = 1080cm^2$.

Answer: (b) $1080cm^2$

Check your Progress

1. Cricumference $= 2\pi r$

$r = 2.8cm$

$= 2 \times \frac{22}{7} \times 2.8 = 17.6cm$

2. $L = 2\pi r$

$4\pi r = 2\pi r$

$r = \frac{4\pi}{2\pi}$

$r = 2$

3. Area of circle $= \pi r^2$

$= \pi(2r)^2$

$= \pi 4r^2$

$= 4\pi r^2$

4. Area of circle $= 4\pi r$

$4\pi r = \pi r^2$

$4 = \frac{\pi r^2}{\pi r}$

$4 = r$

$r = 4cm$

5. Circumference of circle $= 4\pi$

$2\pi r = 4\pi$

$r = \frac{4\pi}{2\pi}$, $r = 2$

Area of circle $= \pi r^2 = \pi(2)^2$

$= 4\pi cm^2$

6. $C = 2\pi r$

$6\pi = 2\pi r$

$2\pi r = 3cm$

$A = \pi r^2$

$= \pi \times (6)^2$

$= 9\pi cm^2$

7. Area $= b \times h$

$120 = 5 \times 5$

$h = \frac{120}{5}$

$h = 24cm$

8. Area = base × height

$= (6 \times 10)cm^2$

$= 60cm^2$

9. Area of $\Delta = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 10 \times 6 = \frac{60}{2}$

$= 30cm^2$

10. No

12 Algebric Expressions

Exercise 12.1

1.

	Factor	Terms
(a)	x^3, 3y	x, x, x, 3, y
(b)	$3n^2y + 5x^2y$	3, x, x , y, 5, x, x, y
(c)	$-5x^2$,3xyz	–5, x, x, 3, x, y, z
(d)	$5y^2x + 72$	5, y, y, x, 7, z
(e)	–8xy, $5y^2$	–8, x, y, 5, y, y
(f)	$32x^2y$,$24xy^2$	32, x, x, y, 24, x, y, y
(g)	$-14xy + 7y^2z$	–14, x, y, 7, y, y, z
(h)	$5x^2 + 7x - 5$	5, x, x, 7, x, –5

2. (a) Let the number be x

6 times x = 6x

Cube of x = $(x)^3$

= $6x + x^3$

(b) Let the number be x and y

Product of x and y = xy

Difference of x and y = x – y

xy + (x – y)

(c) Let the number be x and y

Sum of numbers: x + y

Sum of numbers: x × y = xy

xy + (x + y)

(d) Let the number be x, y and z

Sum of 2 number: x + y

7 Times the others number: 7z

(x + y) = 7z

(e) Let the number x and y

Twice of a number: 2 × x = 2x

= 2x + y

(f) Let the number be x and y

Product of numbers: x × y = xy

= 8 + xy

(g) Let the number be x and y

Product of x with 5 = 5 × x = 5x

= 5x + y

(h) Let the number be x

Product of x with 5 = 5 × x = 5x

= 12 – 5x

3.

	Terms	Numerical Coffiecient
(a)	3 – 5y	–5
(b)	5x2	5, –7
(c)	–12xy2 + 8xy – 6	–12, 8, –6
(d)	7a + 15a2b	7, 14
(e)	5(1 + b + h)	5
(f)	7x2y + 5xy	7, 5
(g)	9a2b + 6	9, 6
(h)	–m2n + 12mn	1, 12

4.

		Terms	Coeffiecient of x
(a)	$4x^2y^2 + 3xy$	$4xy^2$, 3xy	$4y^2$, 3y
(b)	$-x^2 + 7x$	$-x^2$, 7x	7
(c)	$5yz + zx^2 + 3xy$	$zx^2 + 3y$	zx + 3y
(d)	$1 + x + x^2y$	x, x^2y	1, xy
(e)	$6xy^2 + 12xy$	$6xy^2$, 12xy	$6y^2$, 12y
(f)	x + 5y + 6z	x	1

5.

		Terms	Coeffiecient of x
(a)	$-6xy^2 + 3 \times 2$	$-6xy^2$	$-6x^2$
(b)	$-7xy + 4y^2$	–7xy, $4y^2$	–7x, 4y
(c)	$-8y^2 + 12yz$	–8yz, $12y^2z$	–8z, 12yz
(d)	$-5x^2y^2$ + 10xyz	$-5x^2y^2$, 10xyz	$-5x^2y$, 10xz
(e)	$75x + 205y^2$	$205y^2$	205y
(f)	$65yx^2$ + $115y^2x^2$	$65yx^2y$, $115y^2x^2$	$65x^2$, $115yx^2$

6. (a) $2xy, -5x2y, -8xy, -12xy^2$

Like terms: $2xy, -8xy$

(b) $7x^2y2, 4yzx^2, 8zyx^2, 3x^2y, 2y^2x, 5xy^2$

Like terms: $(7x^2yz, -4yzx^2), (2y^2x, 5xy^2)$

(c) $2/5\ ab^2c, 3/5ab^2, \frac{-1}{3}acb^2, \frac{7}{8}a^2b$

Like terms $2/5ab^2c, -1/3acb^2$

(d) $-12xy, 7y^2, 7xy, 8zx$

Like terms $-12xy, 7xy$

7. (a) $5x^2 + 3xy$: 2 terms : Binomial

(b) $-7abc$: 1 term : Monomial

(c) $8 + 12y$: 2 terms : Binomial

(d) $9x^2y + 12x$ terms : Binomial

(e) -6: 1 term : Monomial

(f) $-3x^2y$: 1 term : Monomial

(g) $-3x + 5y^2 + 7y$: 3terms : Trinomial

8. (a) $7xy$

(b) $15y$

(c) $7x^1$

(d) $8b^2$

(e) 6

(f) $5ac$

(g) $-3x + 5y^2 + 7y$: 3 terms : Trinomial

Exercise 12.2

1. (a) $4a + 5a = 9a$

(b) $2a + 3a = 5a$

(c) $7x + 4x = 11x$

(d) $5l - 3l = 2l$

(e) $7x - 4x = 3x$

(f) $8u - 5u = 3u$

(g) $-w - w = 8w$

(h) $7z + 2z = 9z$

2. (a) $5a + 4a + 3b = 9a + 3b$

(b) $(7a + 2a) + 5y = 9a + 5y$

(c) $(4a + a) + 4b = 5a + 4b$

(d) $(12p + 4p) - 5q = 16p - 5q$

(e) $12l - 5l - 3m = 7l - 3m$

(f) $10b - 4b^2 - 5b^2 = 10b - 9b^2$

(g) $(6ab - 5ab) + 2bc = ab + 2bc$

(h) $9h + 10l - 4l + 3k = 9h + (10l - 4l) + 3k$
$= 9h + 6l + 3k$

3. (a) $5x + 7y + 2x - 3y = 5x + 2x + 7y - 3y$
$= 7x + 4y$

(b) $10x - 6 - 7x + 8 = 10x - 7x - 6 + 8 = 3x + 2$

(c) $8x + 7 - 12 - 5x = 8x - 5x + 7 - 12 = 3x - 5$

(d) $7s^2 + 3t - 5s^2 - 8t = 7s^2 - 5s^2 + 3t - 8t = 2s^2 - 5t$

(e) $2p - 3p^2 - 4p + p^2 = 2p - 4p - 3p^2 + p^2 = -2p - 2p^2$

(f) $5y - 7y^2 - 9y + 12y^2 = 5y - 9y - 7y^2 + 12y^2$
$= -4y + 5y^2$

(g) $15 - 7c + 11 - 6c = 15 + 11 - 7c - 6c = 26 - 13c$

(h) $8p - 6q - 8p + 4q = 8p - 8p - 6q + 4q = -2q$

4. (a) $8s^2 + (-5s^2) + (-9s^2) + 5s^2$
$= 8s^2 - 5s^2 - 9s^2 + 5s^2$
$= -s^2$

(b) $7ab + 6ab + (-11ab) + (-18ab)$
$7ab + 6ab - 11ab - 18ab$
$= 13ab - 29ab$
$= -16ab$

(c) $8x^2y + (-12x^2y) + (-5x^2y) + 6x^2y$
$8x^2y - 12x^2y - 5x^2y + 6x^2y$
$= -3x^2y$

(d) $x + y$

$$\begin{array}{r} x + y \\ 2x - y \\ +\ 3x - y \\ \hline 6x - y \end{array}$$

$= 6x - y$

(e)

$$\begin{array}{r} 2a^2 + 4a \\ 5a^2 - 3a \\ +\ 5a^2 - 2a \\ \hline 2a^2 - a \end{array}$$

$= 2a2 - a$

5. (a) $5a + 2b + 6a + 7b = 5a + 6a + 2b + 7b = 11a + 9b$

(b) $8x - 3y + 6x - 9y = 8x + 6x - 3y - 9y = 14x - 12y$

(c) $-73 + 5t + 103 + 6t = -73 + 105 + 5t + 6t = 35 + 11t$

(d) $-3w + 9x + 7w - 12x = -3w + 7w + 9x - 12x = 4w - 3x$

6. (a)

$$\begin{array}{r} 5a + b \\ 4a - 2b \\ +\ 2a - b \\ \hline 11a - 2b \end{array}$$

(b)

$$\begin{array}{r} 4x - 2 \\ 3x - 4 \\ 5x - 5 \\ +\ 3x - 6 \\ \hline 13x + 3 \end{array}$$

(c)

$$\begin{array}{r} 7x^2 - 7x + 3 \\ 10x^2 - 3x + 8 \\ +\ 4x^2 - 5x + 9 \\ \hline 21x^2 - x + 20 \end{array}$$

(d)

$$\begin{array}{r} 2a - 4b + 7 \\ 8 - 2b + 3 \\ -\ 5a - 6b - 5 \\ \hline 5a - 4b + 5 \end{array}$$

(e)

$$\begin{array}{r} 4x + 5y + 7 \\ -6x - 2y - 5 \\ -\ 3x - 3y + 2 \\ \hline 7x + 0 + 4 \end{array}$$

Exercise 12.3

1. (a)

$$\begin{array}{r} 5x^2 + 5y \\ -\ 4x^2 - 2y \\ \hline x2 + 11y \end{array}$$

(b)

$$\begin{array}{r} 5m^2 + 0 - 9 \\ -\ 3m^2 + 6m + 3 \\ \hline 2m^2 + 6m - 6 \end{array}$$

(c)

$$\begin{array}{r} 7x + 8y + 6z \\ -\ 5x + 0 - 3z \\ \hline 2x + 8y - 9z \end{array}$$

(d)

$$\begin{array}{r} 4a^2 + 6b + 8c \\ -\ 5a^2 + 4b - 12c \\ \hline 9a^2 + 10b - 20c \end{array}$$

(e)

$$\begin{array}{r} 3a^2 + 4ab + 3b^2 \\ -\ 3a^2 + 4ab - 2b^2 \\ \hline 6a^2 + 0 - b^2 \end{array}$$

2. Total length of both the pipes: Sum of the length of both pipes

$$\begin{array}{r} 5x - 7 \\ -\ 3x + 5 \\ \hline 8x - 2 \end{array}$$

$= (3x + 5) + (5x - 7)$

$= 8x - 2$

Hence, the total Length of the pipe together is $= 8x - 2$

3.

$$\begin{array}{r} 8x^2 + 6xy + 5y \\ 8x^2 + 6xy + 5y \\ +\ 5x^2 - xy + 2y \\ \hline 3x^2 + 5xy + 3y \end{array}$$

$(5x^2 + xy + 2y) = 3x^2 + 5xy + 3y$

Hence, $3x^2 + 5xy + 3y$ should be added to 5x2 + xy + 2y to obtain $8x^2 + 6xy + 5y$

4. $3a^2 - 4b^2 + 5ab - (-a^2 - 3b^2 + 7ab)$

$$\begin{array}{r} 3a^2 - 4b^2 + 5ab \\ -\ a^2 - 3b^2 + 7ab \\ \hline 4a^2 - b^2 - 2ab \end{array}$$

Hence, $4a^2 - b^2 - 2ab$ should be subtracted fomr $3a^2 - 4b + 5ab$ to obtain $-a^2 - 3b^2 + 7ab$

5. Sum of $3x-2y + 8$ and $-y-8 = 3x-2y$

$$\begin{array}{r} 3x - 2y + 8 \\ +\ \quad - y - 8 \\ \hline 3x - 3y - 0 \end{array}$$

$(3x - 3y) - (5x - 2y - 11)$

$$\begin{array}{r} 3x - 3y \\ +\ 5x - 2y - 11 \\ \hline 8x - y + 11 \end{array}$$

6. Money spent on books: ₹$(5x + 7y)$

Money spent on Shirt: ₹$(8x - 3y)$

$= 5x + 8x + 7y - 3y$

$= 13x + 4y$

Hence, Shekhar has spent $13x + 4y$ ruppees on both book

7. Perimeter of triangle: Sum of length of its sides

$= (2x^2 + 4x + 6) + (x^2 + 8) + (8x^2 - 5x)$

$$\begin{array}{r} 2x^2 + 4x + 6 \\ x^2 + 0 + 8 \\ +\ 8x^2 - 5x + 10 \\ \hline 11x^2 - x + 24 \end{array}$$

Hence, perimeter of the triangle is $11x^2 - x + 14$

8. Perimeter of triangle: Sum of length of its sides

$$\begin{array}{r} 5x + y \\ 4x + 3y \\ +\ 7x + y \\ \hline 16x + 5y \end{array}$$

$= (5x + y), (4x + 3y), (7x + y)$

Hence, Perimeter of the triangle is $16x + 5y$.

9. Distance travelled by Bus: $x^2 + 5x + 3$

Distance travelled by Train: $2x^2 + 3x + -5$

Total distance travelled by Deepak: $(x^2 + 5x + 3) + (2x^2 + 3x - 5)$

$$\begin{array}{r} x^2 + 5x + 3 \\ +\ 2x^2 + 3x - 5 \\ \hline 3x^2 + 2x - 2 \end{array}$$

Therefore, total distance covered by Deepal is $3x + 2x - 2$km

10. Perimeter of rectangle = 2(Length + Breadth)

$= 2(5m + x) + (8m + 2x$

$= 2(5m + 8m + x + 2x)$

$= 2\ (13m + 3x) = 29m + 6x$

$\therefore$ Perimetre of the rectangle is $29m + 6x$

11. Perimeter of square = 4 × side

$= 4 \times (5x + 3)$

$= 20x + 3$

Hence, Perimeter of square is $20x + 3$ meters.

12. Perimeter of equilateral traingle

$= 3 \times$ side $= 3 \times (5x + 3)$ metres

$= 15x + 3$ metres

13. Ribbon left: Total length of ribbon – Ribbon cut for use

$= 7p - 3 - (2p + 3)$

$= 7p - 3 - 2p = 7p - 2p - 3 - 3$

$= 5p - 6$

Hence, length of ribbon left is $5p - 6$ metres.

14. Money left: Total money – Money spent

$= 17z^2 + 4z - 3 - (8z^2 - 7z - 9)$

$= 17z^2 + 4z - 3 - 8z^2 + 7z + 9$

$= 17z^2 - 8z + 4z + 7z - 3 + 9$

$= 9z^2 + 11z + 6$

Hence, money left with Nadhu is 9z2 + 1z + 6 reppees.

Exercise 12.4

1. Degree (Higest power of the polynomial)

(a) 6

(b) 7

(c) 3 + 2 = 5

(d) 1

(e) 0

2. (a) $2x^5 - 3x^3 + 5x^2 + 1$ $(5 > 3 > 2 > 0)$

(b) $a^6 + 4a^5 + 3a^3 - 1$ $(6 > 5 > 3 > 0)$

(c) $-2x^4y^7 - 7x^6y - 2x^2y + 3xy^3 + 2xy^2$ $(11 > 6 > 3 > 2)$

(d) $-5x^7y^8z^2 + 12x^5y^7z - 3x^2y^4z^3 - 5xy^3$ $(17 > 12 > 5 > 3)$

3. (a) $x + 12$, $(x = 6)$

$6 + 12 = 18$

(b) $x - 40$, $(x = 100)$

$100 - 40 = 60$

(c) $23 - p$, $(p = 13)$

$23 - 12 = 10$

(d) $25 - (a + b)$, $(a = 6, b = 3)$

$25 - (6 + 3) = 23 - 9 = 14$

(e) $(p + q) - (p - q)$, $(p = 8, q = 4) = (8 + 4) - (8 - 4) = 12 - 4 = 8$

4. (a) $c = n \times p$

$c = np$

(b) $s = c + p$

(c) $\angle A + \angle B + C = 180°$

(d) Area of square $= (a)^2$

(e) $a = l \times b = a = lb$

Review Exercise

1. (a) $5b - 3b = 2b$

(b) $15x - 9x = 6x$

(c) $3p + p = 4p$

(d) $7q + q = 8q$

(e) $8ab + 4ab - 2ab$

$= 12ab - 2ab = 10ab$

(f) $9xy + 7yx = 9xy + 7xy = 10xy$

(g) $8C - C + 2C = 9C$

2. (a) $5a + 7x + 4a - 5h = 5a + 4a + 7h - 5h = a + 2h$

(b) $3w^2 + 2w - 2w^2 + 3w + w^2 = 3w^2 - 2w^2 + w^2 + 2w + 3w = 5w$

(c) $12ab + 6bc - 4ab + 6bc = 12ab - 4ab + 6bc + 6bc = 8ab + 12bc$

(d) $12 + 6x + 7p - 8x$: Has number like terms.

3. (a) $5ab + 3bc - 7ab + bc = 5ab - 7ab + 3bc + bc = -2ab + 4bc$

(b) $4x^2 + 10x - 13x + 14x^2 = 4x^2 + 14x^2 + 10x - 12x = 18x^2 - 3x$

(c) $8t + 6q + 2t - 8q = 8t + 2t + 6q - 8q = 10t - 2q$

(d) $4m + 3g - 6g - 3m = 4m - 3m + 3g - 6g = m - 3g$

4. (a)

		$8xy$	$-$	x
		$12xy$	$-$	x
$-$	$x2$	$+$ 0	$+$	$7x$
	$x2$	$+ 4xy$	$+$	$5x$

(b)

	$5a$	$+$	$8b$	$-$	$5c$
	$4a$	$-$	$5b$	$-$	$2c$
$+$	$3a$	$+$	$4b$	$+$	$6c$
	$x2$	$-$	$7b$	$+$	$9c$

5 (a) $7ax - 3ay + 3ax + 8ay$

$7ax + 3ax - 3ay + 8ay$

$10ax + 5ay$

(b) $7a^2 + 12b^2 - 5a^2 + 12b^2$

$7a^2 - 5a^2 + 12b^2 + 12b^2$

$2a^2 + 24b^2$

(c) $8x^2 + 5y^2 - 5xy + 5x^2$

$8x^2 + 5x^2 + 5y^2 - 5xy$

$13x^2 + 5y^2 - 5xy$

6. (a) $7ax + -3ay + 3ax + 8ay$

$7ax + 3ax - 3ay + 8ay$

$10ax + 5ay$

(b) $7a^2 + 12b^2 - 5a^2 + 12b^2$

$7a^2 - 5a^2 + 12b^2 + 12b^2$

$2a^2 + 24b^2$

(c) $8x^2 + 5y^2 - 5xy + 5x^2$

$8x^2 + 5x^2 + 5y^2 - 5xy$

$13x^2 + 5y^2 - 5xy$

6. (a)

$-15x$	$-$	$17y$	
$-12x$	$-$	$18y$	
$-27x$	$-$	$35y$	

(b)

$-9x^6$	$+$	$3x^4$	$-$	$5x^3$	
$+7x^6$	$+$	$4x^4$	$+$	$21x^3$	
$-2x^6$	$+$	$7x^4$	$+$	$16x^3$	

7. (a)

$5x^2$	$-$	$2x$	$+$	12	
$-2x^2$	$-$	$8x$	$+$	3	
$-3x^2$	$+$	$7x$	$-$	4	
		$3x$	$+$	11	

(b)

	$8x^2$	+	$3xy$	+	y^2
$5x$	0	−	$5xy$	+	y^2
	$-6x^2$	+	0	−	$4y^2$
$5x$	$2x^2$	+	$8xy$	−	$2y^2$

(c)

$-9a^2b$	+	$7ab^2$	−	ab
$5a^2b$	+	$4ab^2$	−	$4ab$
$-4a^2b$		$11ab^2$	−	$5ab$

8. (a)

$9ab$
$-12ab$
$-3ab$

(b)

$2x$
$-5x$
$-7x$

(c)

$25pq$
$-18pq$
$7pq$

(d)

$7a^2b$
$-3a^2b$
$4a^2b$

9. (a)

$2a$	+	$3b$
$-7a$	+	$4b$
$-5a$	−	b

(b)

−	$3a$	−	$5b$
−	$12a$	−	$7b$
	$9a$	+	$2b$

(c)

$15m$	−	$32x$
$-12m$	−	$14x$
$3m$	−	$18x$

10. $7 + 8y2 + 3y$

$-(5 + 2y^2 - 2y)$

7	+	$8y^2$	+	$3y$
5	+	$2y^2$	−	$2y$
2	+	$6y^2$	−	$5y$

Hence, $2y^2 - 2y + 5$ is $6y^2 + 5y + 2$ smaller than $8y^2 + 3y + 7$

11. $9x^2 - 8y^2 - (3x^2 - 3y^2)$

$9x^2$	−	$8y^2$
$3x^2$	−	$3y^2$
−	+	
$6x^2$	−	$5y^2$

12. Number of women: Total number of people − Total number of men

$= 8z^2 + 4z + 9 - (2z^2 - 9z + 2)$

$= 8z^2 + 4z + 9 - 2z^2 + 9z - 2$

$= 8z^2 - 2z^2 + 4z + 9z + 9 - 2$

$= 6z^2 + 13z + 7$

Hence, there are $6z^2 + 13z + 7$ women.

13. (a) 10

(b) 7

14. (a) 5a3 b4c2 − 4a2 b2c + 3a2bc + 8 = 7abc ($9 > 4 > 2 > 1$)

Multiple Choice Questions

1. (c) $-5xy$

2. (a) 15

3. 3 terms = (c) trinomial

4.

$-3y^2$	−	$6y$	+	1
	−	$12y$	−	6
$-3y^2$	−	$18y$	+	7

(b) $-3y2 - 18y + 7$

5. $-x^2 - 2x + 3 - (x^2 + 2x - 3)$

−	x^2	−	$2x$	+	3
	x^2	+	$2x$	−	3
−		−		+	
$-2y^2$	−	$4x$	+	6

(a) $2x^2 + 4x + 6$

Check Your Progress

1. (a) 2term = Binomial

(b) 1 term: Monomial

(c) $\frac{a+ b + 1}{3} = \frac{a}{3} + \frac{b}{3} + \frac{1}{3}$

: 3 terms = Trinomial.

2. (a) $-7y$

(b) y^2

(c) $5y^2$

3.

	x2	+	y2
–	x2	–	y2
	0		0

4. 0 – m = –5

5. 1 – a2

6. In a constant term the power of the varibale is zero, so it's degree is 0.

13 Power and Exponents

Exerciise 13.1

1. (a) $2^4 = 2 \times 2 \times 2 \times 2 = 16$

(b) $5^2 = 5 \times 5 = 25$

(c) $63 = 6 \times 6 \times 6 = 216$

(d) $13^2 = 13 \times 13 = 169$

(e) $43 = 4 \times 4 \times 4 = 64$

(f) $54 = 5 \times 5 \times 5 \times 5 = 625$

(g) $5^5 = 5 \times 5 \times 5 \times 5 \times 5 = 3125$

(h) $7^4 = 7 \times 7 \times 7 \times 7 = 2401$

(i) $3^4 = 3 \times 3 \times 3 \times 3 = 81$

(j) $-2^4 = -2 \times -2 \times -2 \times -2 = 16$

(k) $9^3 = 9 \times 9 \times 9 = 729$

(l) $8^4 = 8 \times 8 \times 8 \times 8 = 4096$

2.

		Base	Exponent	Expanded form	Value
(a)	3^3	3	3	$3 \times 3 \times 3$	27
(b)	5^3	5	3	$5 \times 5 \times 5$	125
(c)	7^3	7	3	$7 \times 7 \times 7$	373
(d)	9^4	9	4	$9 \times 9 \times 9 \times 9$	6561

3. (a) $5^3 = 5 \times 5 \times 5 = 125$

(b) $(-2)^3 = -2 \times -2 \times -2 = -8$

(c) $5^2 = 5 \times 5 = 25$

(d) $(-7)^2 = -7 \times -7 = 49$

(e) $(-6)^3 = -6 \times -6 \times -6 = -216$

(f) $8^3 = 8 \times 8 \times 8 = 512$

4. (a) $\left(\frac{3}{2}\right)^3 = \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} = \frac{27}{8}$

(b) $\left(\frac{-3}{6}\right)^3 = \frac{-3}{6} \times \frac{-3}{6} \times \frac{-3}{6} \times \frac{-3}{6} \times \frac{-3}{6} = \frac{243}{7776}$

(c) $\left(\frac{-7}{8}\right)^4 = \frac{-7}{8} \times \frac{-7}{8} \times \frac{-7}{8} \times \frac{-7}{8} = \frac{2401}{4096}$

(d) $\left(\frac{5}{4}\right)^3 = \frac{5}{4} \times \frac{5}{4} \times \frac{5}{4} = \frac{125}{64}$

(e) $\left(\frac{-9}{7}\right)^3 = \frac{-9}{7} \times \frac{-9}{7} \times \frac{-9}{7} = \frac{-729}{393}$

(f) $\left(\frac{-6}{5}\right)^4 = \frac{-9}{7} \times \frac{-9}{7} \times \frac{-9}{7} \times \frac{-9}{7} = \frac{1296}{625}$

5. (a) $\frac{1}{125} = \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} = \left(\frac{1}{5}\right)^3$

(b) $\frac{1}{156} = \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \left(\frac{1}{4}\right)^4$

(c) $\frac{-27}{125} = \frac{-3}{5} \times \frac{-3}{5} \times \frac{-3}{5} = \left(\frac{-3}{3}\right)^3$

(d) $\frac{1}{156} = \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \left(\frac{1}{4}\right)^4$

(e) $\frac{-1}{343} = \frac{-1}{7} \times \frac{-1}{7} \times \frac{-1}{7} = \left(\frac{-1}{7}\right)^3$

(f) $\frac{81}{144} = \frac{9}{12} \times \frac{9}{12} = \left(\frac{9}{12}\right)^2$

(g) $\frac{1}{10000} = \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} = \left(\frac{1}{10}\right)^4$

(h) $\frac{1}{1000} = \frac{1}{10} \times \frac{1}{10} \times \frac{1}{10} = \left(\frac{1}{10}\right)^3$

Exercise 13.2

1. (a) $4^3 \times 4^4 = 4^{3+4} = 4^7$

(b) $5^2 \times 5^3 = 5^{2+3} = 5^5$

(c) $a^3 \times a^3 = a^{3+3} = a^6$

(d) $\left(\frac{3}{2}\right)^3 \times \left(\frac{3}{2}\right)^2 = \left(\frac{3}{2}\right)^{3+2} = \left(\frac{3}{2}\right)^5$

(e) $\left(\frac{-2}{4}\right)^2 \times \left(\frac{-2}{4}\right)^3 = \left(\frac{-2}{4}\right)^{2+3} = \left(\frac{-2}{4}\right)^5$

(f) $xa \times xb = xa + b$

(g) $p^3 \times p \times p^5 = 9^3 \times p^1 \times p^5 = p^{3+1+5} = p^9$

(h) $a^m \times a^3 = a^m + 3$

(i) $(-3)^5 \times (-3)^2 = -3^{5+2} = -3^7$

(j) $(-3)^5 \div (-3)^3 = (-3)^{5-3} = (-3)^2$

2. (a) $(3^3)^2 = (3)^{3 \times 2} = 3^6$

(b) $(5^3)^2 = 5^{3 \times 2} = 5^6$

(c) $(7^2)^3 = 7^{2 \times 3} = 7^6$

(d) $(9^2)^2 = 9^{2 \times 2} = 9^4$

3. (a) $(x^a)^b = x^{a \times b} = x^{ab}$

(b) $(x3)^a = x^{3 \times a} = x^{3a}$

(c) $(x^9)^5 = x^{a \times 5} = x^{5a}$

(d) $(a^3)^3 = a^{3 \times 3} = a^9$

(e) $(a^2)^4 = a^{2 \times 4} = a^8$

(f) $(b^x)^y = b^{x \times y} = b^{xy}$

(g) $(a^x)^2 = a^{x \times 2} = a^{2x}$

(h) $(3^x)^y = 3^{x \times y} = 3^{xy}$

4. (a) $(2 \times 4)^2 = 8^2 = 64$

(b) $(3 \times 3)^2 = 9^2 = 81$

(c) $(7 \times 2)^2 = 14^2 = 196$

(d) $(5 \times 4)^2 = 20^2 = 400$

(e) $(a \times b)^2 = ab^2$

(f) $(x \times y)^9 = xy^a$

(g) $(a \times b)^z = ab^x$

(h) $(a \times b)^5 = ab^5$

5. (a) $x^2 \times y^2 = xy^{2+1} = xy^4$

(b) $x^{a \times a} = x^{a+a} = x^{2a}$

(c) $5^3 \times 7^3 = 5 \times 7^{3+3} = 35^6$

(d) $8^7 \times 8^9 = 8^{7+9} = 8^{16}$

(e) $3^3 \times a^3 = 3a^{3-13} = 3^{a6}$

(f) $5^x\, 6^x = 5 \times 6^{x+x} = 30^{2x}$

(g) $3^a\, 5^a = 3 \times 5^{a+a} = 15^{2a}$

(h) $5^3 \times 5^5 = 5^{3+5} \times 5^8$

6. (a) $4^\circ = 1$

(b) $a^x \div ax = a^{x-x} = a^\circ = 1$

(c) $7^\circ = 1$

(d) $4^\circ \times 3^2 = 1 \times 3^2 = 1 \times 9 = 9$

(e) $4^\circ \times 5^\circ = 1 \times 1 = 1$

(f) $x^\circ = 1$

(g) $x^\circ, y^\circ = 1 \times 1 = 1$

(h) $p^\circ, q^\circ = 1 \times 1 = 1$

7. (a) $\frac{1}{2^3} = 2^{-3}$

(b) $\frac{1}{4^3} = 4^{-3}$

(c) $\frac{4^5}{4^8} = 4^{5-8} = 4^{-3}$

(d) $\frac{a^3 \times a^2}{a^7} = a^{3+2-7} = a^{5-7} = a^{-2}$

(e) $\frac{a^{-2}}{a^4} = a^{-2-4} = a^{-6}$

(f) $x^\circ = 1$

(g) $x^\circ \times y^\circ = 1 \times 1 = 1$

(h) $p^\circ \times q^\circ = 1 \times 1 = 1$

8. (a) $\frac{(24)^2 \times 5^3}{8^2 \times 5} = \frac{2^{4 \times 2} \times 5^3}{(2^3)^2 \times 5} = \frac{28 \times 5^3}{2^6 \times 5}$

$= \frac{2^{8-6} \times 5^{3-1}}{2^2 \times 5^2} = 4 \times 25 = 100$

(b) $\frac{8^3 \times 4^3}{64 \times 4} = \frac{8^3 \times 4^3}{8^2 \times 4} = \frac{8^{3-2} \times 4^{3-2}}{8 \times 4 = 32}$

(c) $(7^\circ - 5^\circ) \times 40^\circ$

$(1 - 1) \times 1 = 0 \times 1 = 0$

(d) $\frac{5^3 \times 3^5 \times 6}{3^2 \times 25} = \frac{5^3 \times 3^5 \times 6}{3^2 \times 5^2}$

$= \frac{5^{3-2} \times 3^{5-2} \times 6}{5^1 \times 3^3 \times 6 = 5 \times 7 \times 6 = 810}$

(e) $[(52)3 \times 54] \div 53 = 56 + 4 - 3$

$[5^6 \times 5^4] \div 5^3 = 5^{6+4-3}$

$= 510 - 3 = 57 = 78125$

Review Exercise

1. (a) $(-4)3 = -4 \times -4 \times -4 = -64$

(b) $5^4 = 5 \times 5 \times 5 \times 5 = 625$

(c) $3^6 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729$

(d) $(-5)6 = -5 \times -5 \times -5 \times -5 \times -5 \times -5 = 15625$

(e) $\left(\frac{-1}{5}\right)^3 = \frac{-1}{5} \times \frac{-1}{5} \times \frac{-1}{5} = \frac{-1}{125}$

(f) $\left(\frac{-3}{7}\right)^2 = \frac{-3}{7} \times \frac{-3}{7} = \frac{9}{49}$

(g) $\left(\frac{-1}{15}\right)^3 = \frac{-1}{15} \times \frac{-1}{15} = \frac{-1}{3375}$

(h) $\left(\frac{-1}{12}\right)^3 = \frac{-1}{12} \times \frac{-1}{12} \times \frac{-1}{12} = \frac{-1}{1728}$

2. (a) $4^7 \div 4^6 = 4^{7-6} = 4^1 = 4$

(b) $5^2 \div 5^4 = 5^{2-4} = 5^{-2} = \frac{4^2}{5} = \frac{1}{25}$

(c) $x^3 \div x^b = x^{3-b}$

(d) $a^x \div x^y = a^{x-y}$

(e) $a^7 \div a^5 = a^{7-5} = a^2$

(f) $b^4 - b^5 = b^{4-5} = b^{-1} = \frac{1^2}{b} = \frac{1}{b}$

(g) $7^5 \div 7^8 = 7^{5-8} = \frac{1^3}{7} = \frac{1}{243}$

(h) $m^3 \div m^7 = m^{3-7} = m^{-4} = \frac{1^4}{m} = \frac{1}{m^4}$

(i) $(4 \times 5)^x = 20^x$

(j) $3^4 \times 4^4 = (3 \times 4)^{4+4} = 12^8 = 429981696$

3. (a) $(4^0)^5 = 1^5 = 1$

(b) $(5^3)^0 = 125^0 = 1$

(c) $(m^4)^0 = 1$

(d) $(X^4)^0 = 1$

(e) $\left(\frac{1}{2}\right)^3 = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

(f) $\left(\frac{7}{3}\right)^3 \times 3 = 1 \times 3 = 3$

(g) $\left(\frac{1}{5}\right)^4 = \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} = \frac{1}{625}$

(h) $\left[\left(\frac{2}{3}\right)^2\right]^3 = \frac{2}{3}^{2+3} = \left(\frac{2}{3}\right)^5 = \frac{32}{243}$

(i) $\left(\frac{4}{7}\right)^{-3} = \left(\frac{7}{4}\right)^3 = \frac{343}{64}$

(j) $\left(\frac{3}{5}\right)^{-3} = \left(\frac{5}{3}\right)^3 = \frac{125}{27}$

(k) $\left(\frac{1}{4}\right)^{-4} = 4^4 = 256$

(l) $\left(\frac{5}{7}\right)^{-3} = \left(\frac{-7}{5}\right)^3 = \frac{-343}{125}$

4. (a) 483×10^3

(b) 503×10^4

(c) 808×10^5

5. (a) $5.416 \times 1000000 = 5146000$

(b) $3247 \times 10^5 = 3.247 \times 100000 = 324700$

(c) $7.689 \times 10^4 = 7.689 \times 10000 = 76890$

6. (a) $(3^{20} \div 3^{13}) \times 35 = 3^{20-15+5} = 3^{20-20} = 3^0 = 1$

(b) $\frac{45 \times 65 \times 27}{3^7 \times 8^3} = \frac{((2)^2)^3 \times 6^5 \times (3)^3}{3^7 \times (2^3)^5}$

$= \frac{2^{10} \times 6^5 \times 3^3}{3^7 \times 2^{15}}$ $2^{10-15} \times 6^5 = 3^{3-7} = 2^{-5} \times 6^5 \times 3^{-4} = \frac{1}{32} \times 7776 \times \frac{1}{81} = \frac{7776}{2592} = 3$

(c) $\frac{28^5 \times (-m)5\ n^2}{14^3 \times a^3 n} = \frac{(14 \times 2)^5 \times (-m)^5 n^2}{143 \times a^3 n}$

$= \frac{14^5 \times 2^5 \times -m^5 n^{2-1}}{a^3} = \frac{14^{5-3} \times 2^5 \times -m^5 n}{a^3}$

$= \frac{14^2 \times 2^5 \times -m^5 n}{a^3} = \frac{-6272 m^5 n}{a^3}$

$= -6272 m^5 n a^{-3}$

(d) $\frac{343 \times 64a^7 \times b^5}{56 \times a^3 b^2} = \frac{343 \times 64a^{7-a3} \times b^{5-b2}}{56}$

$= \frac{343 \times 64a^4\ b^3}{56}$

Multiple Choice Questions

1. (b) exponent

2. $(30 - 20) \times 5 = (1 - 1) \times 5 = 0$

(c) 0

3. (c) $\left(\frac{-1}{7}\right)^4$

4. $\frac{243}{32} = \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2} = \left(\frac{-1}{7}\right)^4$

5. $(-7)^5 \div (-7)^3 = -7^{5-3} = (-7)^2$

6. $\left(\frac{-1}{2}\right)^5 \times \left(\frac{-1}{2}\right)^3 = \left(\frac{-1}{2}\right)^{5+3} = \left(\frac{-1}{2}\right)^8$

(a) $\left(\frac{-1}{2}\right)^8$

7. $\left(\frac{1}{4}\right)^5 \times 64 = {}_{16}\cancel{\frac{1}{1024}} \times \cancel{64}^{1} = \frac{1}{16}$ (c) $\frac{1}{16}$

8. $\left[\left(\frac{1}{3}\right)^2\right]^4 = \left(\frac{1}{3}\right)^{2 \times 4} = \frac{1^8}{3}$ (b) $\frac{1^8}{3}$

9. (a) $\left(\frac{-3}{74}\right) = \frac{-3}{2401}$, $\left(\frac{-3}{7}\right)^4 = \frac{81}{2401}$: $-\frac{3}{2401} \neq \frac{81}{2401}$

10. $\left(\frac{-2}{5}\right)^7 \div \left(\frac{-2}{5}\right)^5 = \left(\frac{-2}{5}\right)^{7-5} = \left(\frac{-2}{5}\right)^2 = \frac{4}{25}$

(a) $\frac{4}{25}$

11. $[19]^{12} \times [19]^{18} \div (19)^4 = (19)^{12+18-4} = (19)$ $30 - 4 = 19^{26}$ (c) 26

12. $(81)^4 \div (9)^5 = (9^2)^4 \div (9)^5 = 98 - 95 = 98 - 5$ $= 93 = 729$ (c) 729

13. $(3)^8 \times (3)^4 = (3)^{8+4} = 3^{12} = (729)^2$ (c) $(729)^2$

14. $2^{2n-1} = 8^{3-n}$

$2^{2n-1} = (2)^{3\,(3-n)}$

$2- = 3-$

$2^{n-1} = 9 - 3n$

$2x + 3x = 9 + 1$

$5x = 10$

$x = 2$

Answer: (d) 2

15. (b) $3^4 = 81$(c) $(1000)^{12} \div (10)^{30} = (10^3)^{12} \div 10^{30} = 10^{36} \div 10^{30}$

$= 10^{36-30} = 10^6 = (1000)^2$

(a) $(1000)^2$

Check your progress

1. $\frac{5}{8} \times \frac{5}{8} \times \frac{5}{8} \times \frac{5}{8} \times \frac{5}{8} = \left(\frac{5}{8}\right)^5$

2. $\left(\frac{5}{3}\right)^3 = \frac{5}{3} \times \frac{5}{3} \times \frac{5}{3} = \frac{125}{27}$

3. $\left(\frac{1}{3}\right)^4 = \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{81}$

4. Reciprocal of $\left(\frac{1}{7}\right)^4 = 7^4 = 2401$

5. $\left(\frac{1}{7}\right)^\circ = 1$

6. $\left(\frac{4}{7}\right)^2 \times \left(\frac{4}{7}\right)^2 = \left(\frac{4}{7}\right)^{2+2} = \frac{4^4}{7}$, m = 4

7. $\left[\left(\frac{1}{3}\right)^3\right]^2 = \left(\frac{1}{3}\right)^{3 \times 2} = \frac{1^6}{3}$, x = 6

8. $\left(\frac{1}{3}\right)^3 \times (x)5 = \left(\frac{1}{3}\right)^8$

$x^5 = \frac{1}{3} \div \frac{1^3}{3}$

$x^5 = \left(\frac{1}{3}\right)^{8-3}$

$x^5 = \frac{1^5}{3}$

$x = \frac{1}{3}$

9. $\frac{32}{243} = \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} = \left(\frac{2}{3}\right)^3$

10. $\left(\frac{4}{5}\right)^3 \div \left(-\frac{4}{5}\right)^3 = (-1)^{3m}$

$= \left(\frac{4}{5} \div \frac{-4}{5}\right)^{3-3} = (-1)^{3m}$

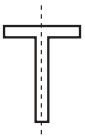
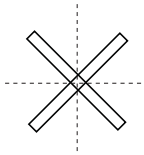
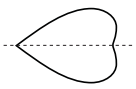
$= (-1)^0 = (-1)^{3m}$

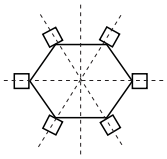
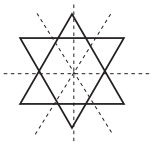
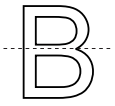
$m = 0$

14 Visualising 3d - Shapes

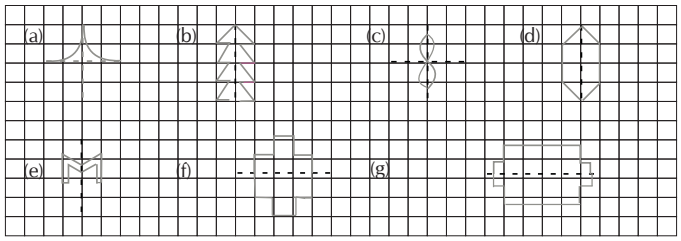
Exercise 14.1

1. To be done by students

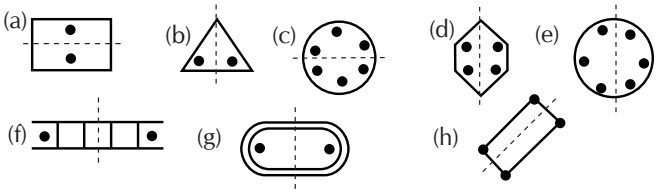
2. (a)  (b)  (c) 

3. (a)  (c)  (d) 

4.



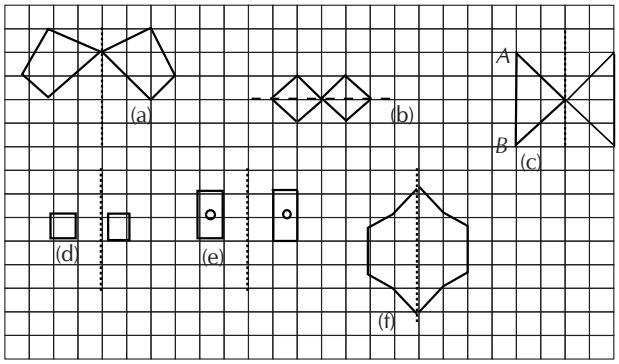
5.

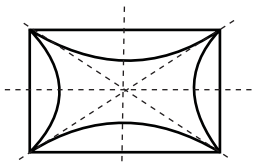


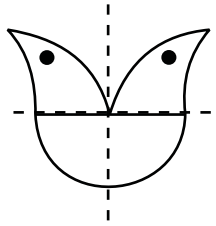
6. To be done by students

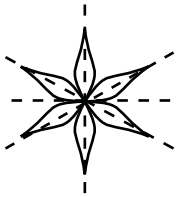
7. (a) Infinite
(b) 4
(c) 1
(d) 3
(e) 1
(f) 2
(g) 0
(h) 8

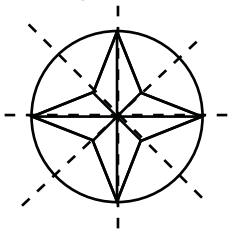
8.



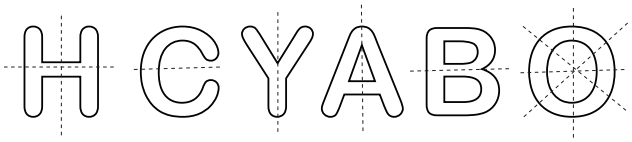
9. (a) 

(b) 

(c) 

(d) 

Exercise 14.2

1. 

2. (a) 1
(b) 1
(c) 2
(d) 4
(e) 0
(f) 2

Exercise 14.3

1. To be done by students

2. (a), (c) and (d)

3. (a) 2
(b) 5
(c) 6
(d) 2
(e) 3

4. (a) 4, 1
(b) 1, 1
(c) 1, 2
(d) 4, 4

5. (b), (e) and (f)

6. To be done by students

7. (a), (d), (h) and (i)

8. 45°, 90°

9. Square

Check your Progress

1. Lines of summetry

2. Yes

3. Yes

4. 4 lines of summetry

5. I an equilateral triangle is rotated by 120° (one third of 360°), then it fits its own outline. Therefore, an equilateral triangle has rational symmetry of order 3.

6. 3 lines of symmety

7. 2 lines of symmetry

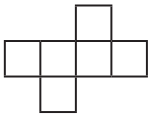
8. If we rotate a parallelogram about its center, it looks the same as the orignal at 180° and 360° rotation so, the order of rotational sysmmetry of a parralelogram about its centre is 2.

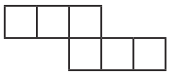
9. The circle has an infinite Order of Rotational Symmetry. In simplistic terms, a circle will always fits into ist orignal outline, regardless of how many times it is rotated.

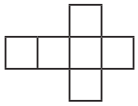
10. Order of rotational symmetry of an equilateral triangle is 3.

15 Visualising 3d - Shapes

Exericse 15.1

1. (c) 

(e) 

(h) 

2. (a) False, as cube has 8 vertices

(b) True, this type of tertaheron is called requalr tetrahedron

(c) True

(d) True, 4 congrunet square triangle and 1

(e) True

(f) False, as a square pyramid has 8 number of edges

3. (a) Cone, Vertex

(b) 8, 6

(c) cured, plane

(d) edge

(f) 3, 2

(g) equilateral

(h) tetrahedron

(i) triangualr

(j) 4

(k) 7

(l) one

4.

	Faces	Vertices	Edges
(a)	6	8	12
(b)	6	8	12
(c)	6	8	12

5. Triangular pyramid

Exercise 15.2

1. (a) L = 0.5cm

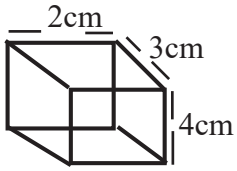
B = 0.5cm

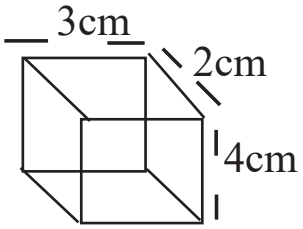
H = 0.5cm

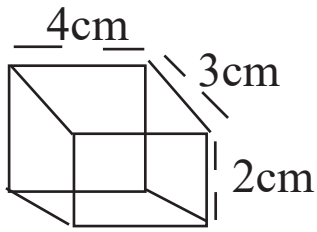
(b) L = 2cm

B = 13cm

H = 23cm

2. 





3. Breadth of new cuboid = 6 × 2cm = 12cm

Length of new cuboid = 6 × 2cm = 12cm

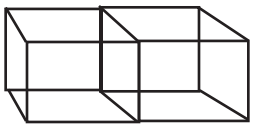
Height remained the same = 2cm

Area of cuboid = 2(lb + bh + hl)

= 2(12 × 12 + 12 × 2 + 2 × 12)cm2

= 2(144 + 24 + 24)cm^2 = 2(144 + 48)cm^2 = 2(192)cm^2 = 384cm^2

Yes, the length of the cuboid is 6 times the edge of the cube.

4. 

Length of new cuboid = 2 × 5cm = 10cm

Breadth of new cuboid = 2 × 5cm = 10cm

Height remainder the sme = 2cm

Area of cuboid = 2(lb + bh + hl)

$= 2(10 \times 10 + 10 \times 2 + 2 \times 10)cm^2$

$= 2(140)cm^2 = 280cm^2$

5. (a) 64 cubes

(b) 5 cubes

(c) 4 cubes

(d) 24 cubes