



READ INDIA

Maths

Teacher's Manual

Class VII

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A Unit of Vidyalaya Prakashan

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New Delhi

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Chapter

1

Integers

➤ Exercise – 1A

Q1. (a) 25

(b) 74

(c) 63

(d) 12

Q2. (a) $(-3)^2 \times (-2)^4 \times (-1)^5$

$$= 9 \times 16 \times -1 = -144$$

(b) $|-8| + |8|$

$$8 + 8 = 16$$

(c) $|-3| + |-2| + |-7|$

$$3 + 2 + 7 = 12$$

(d) $5 \times [25 + \{(-4) \times (16 - 8 \div 2)\}]$

$$5 \times [25 + \{(-4) \times (16 - 4)\}]$$

$$5 \times [25 + (-4) \times 12]$$

$$5 \times [25 - 48]$$

$$5 \times (-23) = -115$$

Q3. (a) -9 and 8

$$-9 + 8 = -1$$

(b) $17 + (-2) = 15$

(c) $-6 + 6 = 0$

Q4. Subtract

(a) 15 from -2

$$(-2) - 15 = -(15 + 2) = -17$$

(b) -4 from -3

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

(c) -18 from 13

$$-13 - (-18) = 13 + 18 = 31$$

Q5. Let Sum of integer a and $b = (-15)$

If $a = -18$

$$-18 + b = -15$$

$$b = -15 + 18$$

$$b = 3$$

So, other integer = 3

Q6. 0 is the integer which is neither positive nor negative.

Q7. $(-36 + 52) - 48$

$$16 - 48 = -32$$

Q8. $(-34 + 40) - [-9 + (-19_)]$

$$6 - [(-9 - 19)]$$

$$6 - (-28)$$

$$6 + 28 = 34$$

Q9. (a) $(-8) + (-4)$ $(-8) - (-4)$

$$(-8) - 4 \qquad -8 + 4$$

$$-12 \qquad < \qquad -4$$

(b) $23 - 41 + 11$ $23 - 41 - 11$

$$-7 \qquad > \qquad -29$$

(c) $39 + (-24) - 15$ $36 + (-52) - (-36)$

$$39 - 24 - 15 \qquad 36 - 52 + 36$$

$$0 \qquad < \qquad 20$$

(d) $-231 + 79 + 51$ $-399 + 159 + 81$

$$-101 \qquad > \qquad -159$$

➔ Exercise – 1B

- Q1.** (a) $(-1) \times 225 = -225$
(b) $(-316) \times (-1) = 316$
(c) $(-1) \times (-2) \times (-3) \times (-4) = 24$
(d) $(-3) \times (-6) \times (-2) \times (-1) = 36$
(e) $(-18) \times (-5) \times (-4) = -360$
- Q2.** (a) $(-35 \div 5) = -7$
(b) $(-70) \div (-14) = 70 \div 14 = 5$
(c) $121 \div (-11) = -(121 \div 11) = -11$
(d) $(-1899) \div 9 = -(1899 \div 9) = -211$
(e) $0 \div (-12) = 0$
- Q3.** (a) positive
(b) negative
(c) 75
(d) -48
(e) -10
(f) -9
(g) -11

➔ Exercise – 1C

- Q1.** (a) False
(b) True
(c) False
(d) False
(e) True
- Q2.** (a) $(433 \times 549) \times 0$
 $(433 \times 0) \times 549 = 0 \times 549 = 0$
(b) $156 \times 88 + 156 \times 1$

$$156(88 + 1) = 156 \times 89 = 13884$$

(c) $235 \times 28 + 235$

$$235(28 + 1) = 235 + 29 = 6815$$

(d) $(-111) \times (-44) + (-44) \times (-121)$

$$44(111 + 121) = 44 \times 232 = 10208$$

Q3. (a) $2 \times [(-6) \times (-7)]$

$$2 \times [42] = 84$$

(b) $-12 \times [(-10) \times (5)]$

$$-12 \times (-50) = 600$$

(c) $-9 \times [-1 \times (2)]$

$$-9 \times -2 = 18$$

(d) $143 \times [(-100) \times (-1)]$

$$143 \times 100 = 14300$$

Q4. (a) $3 \times (-16) = -48$

(b) $(-122) \times 4 = -488$

(c) $(-98) \times (-81) = 7938$

(d) $(-1) \times (-9) \times (-345) = -(9 \times 345) = -3105$

Q5. (a) $4 \times (-6 + x) = 5 \times (-2) + 3$

$$-24 + 4x = -10 + 3$$

$$4x = -7 + 24$$

$$x = \frac{17}{4}$$

(b) $(213 \times 77) + (77 \times 213) = (213 \times 77) + (x \times 213)$

$$(213 \times 77) + (77 \times 213) - (213 \times 77) = x \times 213$$

$$x = \frac{77 \times 213}{213} = 77$$

(c) $15 \times (14 + 32) = (15 \times 14) + (x \times 32)$

$$(15 \times 14) + (15 \times 32) - (15 \times 14) = (x \times 32)$$

$$x = \frac{15 \times 32}{32} = 15$$

► Exercise – 1D

Q1. Let one number be = x

Then $x + 250 = -310$

$$x = -310 + (-250)$$

$$x = -560$$

Q2. Let one of them be x

So, $-4 \times x = 128$

$$x = \frac{128}{-4} = -32$$

$$x = -32$$

Q3. An aircraft

Fly at height = 650 m

Land at height = 260 m

So, height loss = 390 m

Q4. Temperature during months = 23°C

Actual temperature at 6 am = $23 - 7 = 16^\circ\text{C}$

At 9 am = $23 + 5 = 28^\circ\text{C}$

At 12 noon = $23 + 8 = 31^\circ\text{C}$

At 4 pm = $23 + 2 = 25^\circ\text{C}$

Q5. Given Profit of 1 bag of white cement = ₹ 8

Loss of 1 bag of grey cement = ₹ 5

(a) Profit on selling 3000 bags of white cement

$$= 3000 \times 8$$

$$= ₹ 24,000$$

Loss of selling 5000 bags of grey cement

$$= 5000 \times ₹ 5$$

$$= ₹ 25,000$$

Since Profit < Loss

Therefore, his total loss on selling the grey cement

bags = Loss – Profit

$$= 25,000 - 24,000$$

$$= 1,000$$

(b) Let the number of bags of white cement be x

According to question, Loss = Profit

$$\therefore 5 \times 6,400 = x \times 8$$

$$\Rightarrow x = \frac{5 \times 6400}{8} = 4000 \text{ bags}$$

Thus, he must sell 4000 white cement bags to have neither profit nor loss.

Q6. (a) Marks given for one correct answer = 3

Marks given for 12 correct answers = $3 \times 12 = 36$

Priya scored 20 marks

Therefore, Marks obtained for incorrect answers

$$= 20 - 36$$

$$= -16$$

Now marks given for one incorrect answer = -2

$$\therefore \text{Number of incorrect answers} = (-16) \div (-2) \\ = 8$$

(b) Marks given for seven correct answers = $3 \times 7 = 21$

Palas scores = -5

Marks obtained for incorrect answers = $-5 - 21 = -26$

Now, marks given for one incorrect answer = -2

$$\text{Therefore, number of incorrect answers} = (-26) \div (-2) \\ = 13$$

Thus, Palak has attempted 13 incorrect questions.

Q7. Total distance covered by shaft = $10 \text{ m} - (-350) \text{ m}$
 $= 10 + 350$
 $= 360 \text{ m}$

Now, time taken to cover a distance of 6 m by it
 $= 1 \text{ minute}$

So, time taken to cover a distance of 1 m by it
 $= \frac{1}{6} \text{ minute}$

\therefore time taken to cover a distance of 360 m
 $= \frac{1}{6} \times 360$
 $= 60 \text{ minutes}$
 $= 1 \text{ hour}$

Thus, in one hour the mine shaft reaches -350 below the ground.

➔ Multiple Choice Questions

Q1. (b)

Let one number be x

Then $-16 = -8 + x$

$$-16 + 8 = x$$

$$-8 = x$$

Q2. (d)

$$5 - (-9) = +14$$

Q3. (a)

Let ' x ' must be subtracted

So, $-2 - x = -6$

$$6 - 2 = x$$

$$4 = x$$

Q4. (b)

Let number be 'a'

$$\frac{a}{3} \begin{matrix} \nearrow -15 \\ \searrow 1 \end{matrix}$$

So, $a = -45$

Q5. (c) 0

Q6. (a)

$$\left(\frac{\{-8 + (-12)\} - 10}{3} \right) \times -2$$

$$\left(\frac{-20 - 10}{3} \right) \times -2 = \left(\frac{-30}{3} \right) \times -2$$

$$-10 \times -2 = +20$$

Q7. (b)

$$0 \div 8 = 0$$

Q8. (a)

tanker contains = 400 l

decrease in petrol in 1 hour = 9 l

and in 10 hours = 90 l

So, left petrol is = $400 - 90 = 310$ l



Chapter

2

Fractions and Decimals

↳ Exercise – 2A

$$\text{Q1. (a) } \frac{3}{5} + \frac{4}{5} = \frac{3+4}{5}$$
$$= \frac{7}{5}$$

$$\text{(b) } \frac{8}{17} - \frac{3}{17} = \frac{8-3}{17}$$
$$= \frac{5}{17}$$

$$\text{(c) } \frac{5}{14} + \frac{9}{14} = \frac{5+9}{14}$$
$$= \frac{14}{14}$$
$$= 1$$

$$\text{(d) } \frac{15}{21} - \frac{11}{21} = \frac{15-11}{21}$$
$$= \frac{4}{21}$$

$$\text{Q2. (a) } \frac{16}{5} - \frac{17}{7}$$
$$\frac{16 \times 7 - 17 \times 5}{35} = \frac{112 - 85}{35}$$
$$= \frac{27}{35}$$

$$\begin{aligned}
 \text{(b)} \quad \frac{5}{2} + \frac{7}{3} - \frac{5}{4} &= \frac{5 \times 6 + 7 \times 4 + (-5) \times 3}{12} \\
 &= \frac{30 + 28 + (-15)}{12} \\
 &= \frac{43}{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad 4\frac{1}{6} + 3\frac{1}{4} &= \frac{25}{6} + \frac{13}{4} \\
 &= \frac{25 \times 2 + 13 \times 3}{12} \\
 &= \frac{50 + 39}{12} = \frac{89}{12} \quad \text{or} \quad 7\frac{5}{12}
 \end{aligned}$$

$$\begin{aligned}
 \text{(d)} \quad \frac{5}{1} + \frac{3}{5} - \frac{7}{10} &= \frac{5 \times 10 + 3 \times 2 - 7 \times 1}{10} \\
 &= \frac{50 + 6 - 7}{10} \\
 &= \frac{49}{10} \quad \text{or} \quad 4\frac{9}{10}
 \end{aligned}$$

Q3. (a) $\frac{5}{8} \times \frac{3}{4} = \frac{15}{32}$

$$\begin{aligned}
 \text{(b)} \quad 3\frac{4}{5} \times 6\frac{3}{7} &= \frac{19}{5} \times \frac{45}{7} \\
 &= \frac{855}{35} \\
 &= \frac{171}{7}
 \end{aligned}$$

(c) $17 \times \frac{3}{7} = \frac{51}{7}$

(d) $\frac{7}{9} \times 1\frac{2}{7} = \frac{7}{9} \times \frac{9}{7} = 1$

Q4. (a) $\frac{1}{4} \times \frac{176}{31} = \frac{44}{31}$

(b) $\frac{9}{10} \times \frac{1000}{999} = \frac{100}{11}$

Q5. Total students = 475

Girls = $\frac{2}{5}$ of them = $\frac{2}{5} \times 475$

So, 190 students were girls

Boys = $475 - 190 = 285$

Boys = 285

Q6. (a) In $\triangle ABE$, $AB = \frac{5}{2}$ cm, $BE = 2\frac{3}{4}$ cm, $AE = 3\frac{3}{5}$ cm

Perimeter = $AB + BE + AE$

$$= \frac{5}{2} + 2\frac{3}{4} + 3\frac{3}{5}$$

$$= \frac{5}{2} + \frac{11}{4} + \frac{18}{5}$$

$$= \frac{50 + 55 + 72}{20}$$

$$= \frac{177}{20}$$

$$= 8\frac{17}{20} \text{ cm}$$

(b) In rectangle $BCDE$, $BE = 2\frac{3}{4}$ cm, $ED = \frac{7}{6}$ cm

Perimeter = 2 (length + breadth)

$$= 2 \left(2\frac{3}{4} + \frac{7}{6} \right)$$

$$= 2 \left(\frac{11}{4} + \frac{7}{6} \right)$$

$$= 2 \left(\frac{33 + 14}{12} \right)$$

$$= \frac{47}{6}$$

$$= 7\frac{5}{6} \text{ cm}$$

$$8\frac{17}{20} \text{ cm} > 7\frac{5}{6} \text{ cm}$$

\therefore the perimeter of $\triangle ABE$ is greater than that of rectangle $BCDE$.

Q7. Part solved by Ramesh = $\frac{2}{7}$

Part solved by Seema = $\frac{4}{5}$

LCM of 7 and 5 = 35

So, $\frac{2}{7} = \frac{2}{7} \times \frac{5}{5} = \frac{10}{35}$ $\frac{4}{5} = \frac{4 \times 7}{5 \times 7} = \frac{28}{35}$

Thus, $\frac{10}{35} < \frac{28}{35}$

i.e., $\frac{2}{7} < \frac{4}{5}$

So, Ramesh solved lesser part.

Q8. In 1 litre of petrol, car covers the distance = 16 km

In $2\frac{3}{4}$ litres of petrol, car covers the distance

$$= 2\frac{3}{4} \text{ of } 16 \text{ km}$$

$$= \frac{11}{4} \times 16 = 44 \text{ km}$$

Thus, car will cover 44 km distance.

Q9. (a) $2\frac{4}{7} + \boxed{} = 6$

$$= \frac{6}{1} - \frac{18}{7}$$

$$= \frac{42 - 18}{7}$$

$$= \frac{24}{7} \quad \text{or} \quad 3\frac{3}{7}$$

(b) $\frac{12}{1} - 2\frac{3}{4} = \frac{\square}{4}$

$$\frac{12}{1} - \frac{11}{4} = \frac{\square}{4}$$

$$\frac{48 - 11}{4} = \frac{37}{4}$$

So, missing number = 37

(c) $5\frac{1}{3} + 9\frac{2}{3} = \frac{16}{3} + \frac{29}{3} = \frac{44}{3}$ or $14\frac{2}{3}$

(d) $9\frac{3}{8} - 2\frac{1}{8} = \frac{75}{8} - \frac{17}{8} = \frac{58}{8} = \frac{29}{4}$ or $7\frac{1}{4}$

Q10. (a) Divide $\frac{24}{30}$ by 9

$$\frac{24}{30 \times 9} = \frac{4}{25}$$

(b) Divide 45 by $\frac{15}{7} = \frac{45 \times 7}{15} = 21$

(c) $\frac{5 \times 3}{2 \times 2} = \frac{15}{4}$ or $3\frac{3}{4}$

Q11. (a) $\frac{1\frac{1}{3} \times 1\frac{1}{5}}{3\frac{1}{4} \times 1\frac{1}{4}} = \frac{4\frac{6}{5}}{\frac{13}{4} \times \frac{5}{4}}$

$$= \frac{24 \times 16}{15 \times 13 \times 5}$$

$$= \frac{128}{325}$$

$$(b) \frac{\frac{61}{8} + \frac{541}{24}}{\frac{183}{11} + \left(\frac{-17}{3}\right)} = \frac{\frac{183 + 541}{24}}{\frac{549 - 187}{33}}$$

$$= \frac{724 \times 33}{24 \times 362} = \frac{11}{4} \text{ or } 2\frac{3}{4}$$

Q12. A man has ₹ 9,600

$$\text{To Ist son} = \frac{1}{6} \times 9600 = ₹ 1600 \text{ to Ist son}$$

$$\text{Remaining left} = ₹ 9600 - ₹ 1600 = ₹ 8000$$

$$\text{To 2nd son} = \frac{1}{4} \times ₹ 8000 = ₹ 2000$$

$$\text{To his wife} = ₹ 9600 - ₹ 2000 - ₹ 1600 = ₹ 6000$$

Q13. Let the number be x

$$5\frac{5}{6} \times x = 3\frac{1}{3}$$

$$\frac{35}{6} \times x = \frac{10}{3}$$

$$x = \frac{10}{3} \times \frac{6}{35}$$

$$= \frac{4}{7}$$

Q14. Let the number of tickets be x

$$\text{Price of one ticket} = 50\frac{3}{4} = ₹ \frac{203}{4}$$

$$\text{Price of } x \text{ tickets} = \frac{203}{4} \times x$$

$$= \frac{203x}{4}$$

$$\text{Total amount} = 6496$$

$$\text{So, } \frac{203x}{4} = 6496$$

$$203x = 6496 \times 4$$

$$x = \frac{25984}{203}$$

$$x = 128$$

Total number of tickets sold is 128.

► Exercise – 2B

$$\begin{aligned} \text{Q1. (a)} \quad \frac{3}{5} \times \frac{1}{5} \div \frac{2}{3} &= \frac{3}{2} \times \frac{1}{5} \times \frac{3}{2} \\ &= \frac{9}{20} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 1\frac{1}{6} \div \frac{1}{2} \times 12 &= \frac{7}{6} \div \frac{1}{2} \times 12 \\ &= \frac{7}{6} \times \frac{2}{1} \times \frac{12}{1} \\ &= 28 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \frac{13}{7} \div \frac{12}{13} \times 4 \div 7 &= \frac{13}{7} \div \frac{12}{13} \times \frac{4}{7} \\ &= \frac{13}{7} \div \frac{48}{91} \\ &= \frac{13}{\frac{48}{91}} \\ &= \frac{13}{7} \times \frac{91}{48} \end{aligned}$$

$$= \frac{169}{48}$$

$$\begin{aligned} \text{(d)} \left(\frac{\frac{1}{5} \times 19}{\frac{5}{19}} \right) \div 5 &\Rightarrow \left(\frac{1}{5} \times \frac{5}{19} \times 19 \right) \div 5 \\ &\Rightarrow \left(\frac{5 \times 19}{19 \times 5} \right) \div 5 = \frac{1}{5} \end{aligned}$$

$$\begin{aligned} \text{(e)} \left(\frac{16}{5} \div \frac{6}{5} \right) \div \left(\frac{16}{3} - \frac{11}{5} \right) \text{ of } \frac{11}{20} \\ \left(\frac{16}{5} \times \frac{5}{6} \right) \div \left(\frac{16 \times 5 - 11 \times 3}{15} \right) \text{ of } \frac{11}{20} \\ \left(\frac{8}{3} \right) \div \left(\frac{80 - 33}{15} \right) \text{ of } \frac{11}{20} \\ \left(\frac{8}{3} \right) \div \left(\frac{47}{15} \times \frac{11}{20} \right) \\ \frac{8}{3} \times \frac{15 \times 20}{47 \times 11} = \frac{800}{517} \end{aligned}$$

$$\begin{aligned} \text{(f)} \frac{12}{5} \div \frac{3}{5} \text{ of } \frac{2}{5} + \frac{1}{2} \text{ of } \frac{3}{4} - \frac{107}{72} \\ \Rightarrow \frac{12}{5} \div \frac{6}{25} + \frac{3}{8} - \frac{107}{72} = \frac{12}{5} \times \frac{25}{6} + \frac{3}{8} - \frac{107}{72} \\ = \frac{10}{1} + \frac{3}{8} - \frac{107}{72} \\ \Rightarrow \frac{720 + 27 - 107}{72} = \frac{640}{72} \\ = \frac{80}{9} = 8\frac{8}{9} \end{aligned}$$

$$\text{(g)} 2\frac{2}{3} \text{ of } 2\frac{1}{4} + \frac{1}{9} \times 4\frac{1}{2} - 2\frac{2}{3} \div \frac{8}{9}$$

$$\frac{8}{3} \text{ of } \frac{9}{4} + \frac{1}{9} \times \frac{9}{2} - \frac{8}{3} \div \frac{8}{9}$$

$$\frac{8}{3} \times \frac{9}{4} + \frac{1}{9} \times \frac{9}{2} - \frac{8}{3} \div \frac{8}{9}$$

$$\frac{6}{1} + \frac{1}{2} - \frac{3}{1}$$

$$\frac{12+1-6}{2} = \frac{7}{2} = 3\frac{1}{2}$$

$$(h) \frac{7}{6} \times \frac{21}{4} + \left[\frac{9}{2} - \frac{3}{10} \right] \div \frac{16}{15} \times \frac{1}{3} - \frac{27}{4} \div \frac{1}{2} \text{ of } \frac{8}{3}$$

$$\frac{7}{6} \times \frac{21}{4} + \left[\frac{45-3}{10} \right] \div \frac{16}{15} \times \frac{1}{3} - \frac{27}{4} \div \frac{1}{2} \text{ of } \frac{8}{3}$$

$$\frac{7}{6} \times \frac{21}{4} + \frac{42}{10} \div \frac{16}{15} \times \frac{1}{3} - \frac{27}{4} \div \frac{1}{2} \text{ of } \frac{8}{3}$$

$$\frac{7}{6} \times \frac{21}{4} + \frac{42}{10} \div \frac{16}{15} \times \frac{1}{3} - \frac{27}{4} \div \frac{4}{3}$$

$$\frac{7}{6} \times \frac{21}{4} + \frac{42}{10} \times \frac{15}{16} \times \frac{1}{3} - \frac{27}{4} \times \frac{3}{4}$$

$$\frac{49}{8} + \frac{21}{16} - \frac{81}{16}$$

$$\frac{98+21-81}{16} \Rightarrow \frac{38}{16} = 2\frac{3}{8}$$

➔ Exercise – 2C

Q1. (a) $7 > 0.7$

(b) $0.8 < 0.88$

(c) $2.03 < 2.30$

Q2. (a) $\frac{8}{100} = 0.08$

(b) $20 + \frac{9}{10} + \frac{4}{100} = 20 + 0.9 + 0.04$

$$= 20.94$$

$$\begin{aligned} \text{(c)} \quad 23 + \frac{2}{10} + \frac{6}{1000} &= 23 + 0.2 + 0.006 \\ &= 23.206 \end{aligned}$$

Q3. 77 rupees 77 paise

$$\text{₹ } 77 + \text{₹ } \frac{77}{100} = \text{₹ } 77 + \text{₹ } 0.77 = \text{₹ } 77.77$$

Q4. $\therefore 100 \text{ cm} = 1 \text{ m}$

$$1 \text{ cm} = \frac{1}{100} \text{ m} \Rightarrow 5 \text{ cm} = \frac{5}{100} = 0.05 \text{ m}$$

Now, $\therefore 1000 \text{ m} = 1 \text{ km}$

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

$$0.05 \text{ m} = \frac{0.05}{1000} = 0.00005 \text{ km}$$

$$\begin{aligned} \text{Q5.} \quad 4 \text{ kg} + \left(8 \times \frac{1}{1000} \right) \text{ kg} &= 4 \text{ kg} + 0.008 \text{ kg} \\ &= 4.008 \text{ kg} \end{aligned}$$

Q6. (a) 20.03

$$20 + \frac{3}{100}$$

(b) 2.03

$$2 + \frac{3}{100}$$

(c) 200.03

$$200 + \frac{3}{100}$$

(d) 2.034

$$2 + \frac{34}{1000}$$

Q7. $36.85 + x = 59.41$

$$x = 59.41 - 36.85$$

$$= 22.56$$

Q8. $42.6 \text{ km} - 28 \text{ km} = 14.6 \text{ km}$

➔ **Exercise – 2D**

Q1. (a) $8 \times 4.6 = 36.8$

(b) $20.1 \times 4 = 80.4$

(c) $0.05 \times 7 = 0.35$

(d) $211.02 \times 4 = 844.08$

Q2. Cost of a book = ₹ 25.75

Cost of 24 books = $24 \times ₹ 25.75$

$$= ₹ 618$$

Cost of 24 books is ₹ 618.

Q3. (a) $36.8 \times 10 = 368.0$

(b) $168.07 \times 10 = 1680.7$

(c) $31.1 \times 100 = 3110.0$

(d) $3.62 \times 100 = 362.0$

(e) $0.08 \times 10 = 0.80$

(f) $0.03 \times 1000 = 30.0$

Q4. In one litre of petrol distance covered = 14.75 km

In 15.5 litres of petrol distance covered = 14.75×15.5

$$= 228.625 \text{ km}$$

∴ Car covers 228.625 km in 15.5 litres of petrol.

Q5. (a) $2.5 \times 0.3 = 0.75$

(b) $1.3 \times 3.1 = 4.03$

(c) $101.01 \times 0.01 = 1.0101$

(d) $10.05 \times 1.05 = 10.5525$

Q6. Cost of 1 kg of rice = ₹ 42.65

$$\begin{aligned}\text{Cost of 18.25 kg of rice} &= ₹ 42.65 \times 18.25 \\ &= ₹ 778.3625\end{aligned}$$

∴ Cost of 18.25 kg of rice is ₹ 778.3625.

➔ **Exercise – 2E**

$$\begin{aligned}\text{Q1. (a) } 0.35 \div 5 &= \frac{35}{100} \times \frac{1}{5} \\ &= \frac{7}{100} = 0.07\end{aligned}$$

$$\begin{aligned}\text{(b) } 65.4 \div 6 &= \frac{654}{10} \times \frac{1}{6} \\ &= \frac{109}{10} = 10.9\end{aligned}$$

$$\begin{aligned}\text{(c) } 14.49 \div 7 &= \frac{1449}{100} \times \frac{1}{7} \\ &= \frac{207}{100} = 2.07\end{aligned}$$

$$\begin{aligned}\text{(d) } 0.80 \div 5 &= \frac{80}{100} \times \frac{1}{5} \\ &= \frac{16}{100} = 0.16\end{aligned}$$

$$\begin{aligned}\text{Q2. (a) } 52.5 \div 10 &= \frac{52.5}{10} \\ &= 5.25\end{aligned}$$

$$\begin{aligned}\text{(b) } 33.1 \div 10 &= \frac{33.1}{10} \\ &= 3.31\end{aligned}$$

$$\begin{aligned}\text{(c) } 272.23 \div 10 &= \frac{272.23}{10} \\ &= 27.223\end{aligned}$$

$$\begin{aligned} \text{(d)} \quad 3.97 \div 10 &= \frac{3.97}{10} \\ &= 0.397 \end{aligned}$$

$$\begin{aligned} \text{Q3. (a)} \quad 0.3 \div 100 &= \frac{3}{10} \times \frac{1}{100} \\ &= \frac{3}{1000} = 0.003 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 0.78 \div 100 &= \frac{78}{100} \times \frac{1}{100} \\ &= \frac{78}{10000} = 0.0078 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad 432.6 \div 100 &= \frac{4326}{10} \times \frac{1}{100} \\ &= \frac{4326}{1000} = 4.326 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad 98.53 \div 100 &= \frac{9853}{100} \times \frac{1}{100} \\ &= \frac{9853}{10000} = 0.9853 \end{aligned}$$

$$\begin{aligned} \text{Q4. (a)} \quad 26.3 \div 1000 &= \frac{263}{10} \times \frac{1}{1000} \\ &= \frac{263}{10000} = 0.0263 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 38.53 \div 1000 &= \frac{3853}{100} \times \frac{1}{1000} \\ &= \frac{3853}{100000} = 0.03853 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad 0.5 \div 1000 &= \frac{5}{10} \times \frac{1}{1000} \\ &= \frac{5}{10000} = 0.0005 \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad 128.9 \div 1000 &= \frac{1289}{10} \times \frac{1}{1000} \\ &= \frac{1289}{10000} = 0.1289 \end{aligned}$$

$$\text{Q5. (a)} \quad 36 \div 0.2 = 36 \div \frac{2}{10}$$

$$= 36 \times \frac{10}{2}$$

$$= 18 \times 10 = 180$$

$$\text{(b)} \quad 30.94 \div 0.7 = \frac{3094}{100} \div \frac{7}{10}$$

$$= \frac{3094}{100} \times \frac{10}{7}$$

$$= \frac{442}{10} = 44.2$$

$$\text{(c)} \quad 0.5 \div 0.25 = \frac{5}{10} \div \frac{25}{100}$$

$$= \frac{5}{10} \times \frac{100}{25}$$

$$= \frac{10}{5} = 2$$

$$\text{(d)} \quad 7.75 \div 0.15 = \frac{775}{100} \div \frac{15}{100}$$

$$= \frac{775}{100} \times \frac{100}{15}$$

$$= \frac{775}{15} = 51.66$$

$$\text{(e)} \quad 2.73 \div 1.3 = \frac{273}{100} \div \frac{13}{10}$$

$$= \frac{273}{100} \times \frac{10}{13}$$

$$= \frac{21}{10} = 2.1$$

$$\begin{aligned} \text{(f)} \quad 37.8 \div 1.4 &= \frac{378}{10} \div \frac{14}{10} \\ &= \frac{378}{10} \times \frac{10}{14} = 27 \end{aligned}$$

Q6. $0.54 \times x = 1.8576$

$$\begin{aligned} x &= \frac{1.8576}{0.54} \\ &= \frac{1.8576}{10000} \times \frac{100}{54} \\ &= 3.44 \end{aligned}$$

Q7. Cost of 14.5 litres of refined oil = ₹ 1194.80

$$\begin{aligned} \text{Cost of 1 litre of refined oil} &= \frac{1194.80}{14.5} \\ &= \frac{119480}{100} \times \frac{10}{145} \\ &= ₹ 82.4 \end{aligned}$$

➔ Multiple Choice Questions

Q1. (c) $\frac{9}{7}$

Q2. (c) $\frac{-6}{5}$

Q3. (a) like fractions

Q4. (a) Boys in the class = $20 \times \frac{3}{4}$

So, girls in the class are = $20 - 15 = 5$

Q5. (a) 500.84

Q6. (d) 0.012×0.15

$$\begin{aligned} &= \frac{12}{1000} \times \frac{15}{100} \\ &= \frac{180}{100000} \\ &= 0.0018 \end{aligned}$$

Q7. (c) $1\ l = 1000\ ml$

$$1\ ml = \frac{1}{1000}\ l$$

$$\begin{aligned} 8\ ml &= 8 \times \frac{1}{1000}\ l \\ &= \frac{8}{1000} = 0.008\ l \end{aligned}$$

Q8. (a) $75.57 \div 0.01$

$$\frac{7557}{100} \times \frac{100}{1} = 7557$$



Chapter

3

Data Handling

➔ Exercise – 3A

Q1. Do yourself

Q2. Do yourself

Q3. Do yourself

Q4. (a) 10

(b) 40

(c) 10

Q5. 1, 2, 2, 3, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 7, 7, 8, 9

$$\text{Range} = 9 - 1 = 8$$

➔ Exercise – 3B

Q1. Multiple of 10 = 10, 20, 30, 40, 50

$$\text{Mean} = \frac{150}{5} = 30$$

Q2. $\frac{1+0+2+3+0+2+3+4+0+2+5}{11}$

$$\text{Mean} = \frac{22}{11} = 2$$

$$\text{Median} = \left(\frac{11+1}{2} \right)$$

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

Arranging data in ascending order

$$= 0, 0, 0, 1, 2, 2, 2, 3, 3, 4, 5$$

Value = 2

Q3.

x	f	xf
115	5	115×5
125	25	125×25
135	4	135×4
145	6	145×6
155	40	155×40
165	20	165×20
	$\Sigma f = 100$	$\Sigma xf = 14610$

$$\text{Mean} = \frac{14610}{100} = 146.1$$

Q4. Arranging the given data in ascending order

32, 35, 36, 37, 38, 38, 38, 40, 42, 43, 43, 43, 45, 47, 50

(a) Mode = 38 and 43

Median = 40

(b) Yes, there are 2 modes.

Q5. Mean =
$$\frac{3 \times 3 + 6 \times 5 + 10 \times 1 + 12 \times 8 + 7 \times 13 + 15 \times 10}{3 + 5 + 1 + 8 + 13 + 10}$$

$$= \frac{386}{40}$$

$$= 9.65$$

$$\text{Median} = \frac{\left[\frac{40\text{th item}}{2} \right] + \left[\frac{40}{2} + 1 \right] \text{th item}}{2}$$

$$\begin{aligned}\text{Median} &= \frac{20\text{th item} + 21\text{th item}}{2} \\ &= \frac{7 + 7}{2} \\ &= 7\end{aligned}$$

Q6. Mean = 20; Median = 25; Mode = ?

$$\begin{aligned}\text{Mode} &= 3 \times \text{median} - 2 \times \text{mean} \\ &= 3 \times 25 - 2 \times 20 \\ &= 75 - 40 \\ &= 35\end{aligned}$$

Q7. Frequency 9 is the highest, so mode = 52

Q8. Mean

$$\begin{aligned}& 2 + 5 + 3 + 3 + 0 + 18 + 5 + 7 + 11 + 15 + 1 + 13 + 0 \\ &= \frac{\hspace{15em} + 8 + 0}{15} \\ &= \frac{91}{15} \\ &= 60.6 \\ \text{Median} &= \frac{15 + 1}{2} \\ &= 8\text{th item}\end{aligned}$$

➔ Exercise – 3C

Q1. Do yourself

Q2. (a) The bar graph shows the area of 5 regions on earth.

(b) India, 44 million km²

(c) 16 million km²

(d) 16 million km²

Q3. (a) Most popular game among 200 students of a school.

(b) cricket, 60

(c) volley ball, 20

(d) 20

(e) $60 : 30 = 2 : 1$

Q4. Do yourself

Q5. Do yourself

Q6. (b) Cricket is most popular.

(c) Watching sports is more preferred.

➔ **Exercise – 3D**

Q1. Total outcomes = $17 + 16 = 33$

$$\begin{aligned}\text{Probability of girl's name} &= \frac{\text{No of girls}}{\text{Total}} \\ &= \frac{16}{33}\end{aligned}$$

Total outcome = 300

$$\begin{aligned}\text{Probability of a baby boy} &= \frac{\text{No of boys}}{\text{Total}} \\ &= \frac{157}{300}\end{aligned}$$

Q2. Total outcome = 6

$$\begin{aligned}\text{(a) Probability of getting '6' is} &= \frac{\text{No of '6' india}}{\text{Total}} \\ &= \frac{1}{6}\end{aligned}$$

(b) No of possible value = 1, 2, 3, 4, 5, 6 *i.e.*, 6

No of favourable outcome = 2, 4, 6 are even = 3

$$\text{Probability} = \frac{3}{6} = \frac{1}{2}$$

Q3. Probability = $\frac{\text{No of favourable event}}{\text{No of possible event}}$

$$0.016 = \frac{\text{No of favourable result}}{250}$$

$$0.016 \times 250 = \text{No of favourable results}$$

$$\text{No of favourable results} = 4$$

i.e., Mahi family brought 4 tickets.

Q4. Sample space

HH

HT

TH

TT

Case I

$$\text{Total outcome} = 2$$

$$\text{Probability} = \frac{\text{No of 'H' occur}}{\text{Total}}$$

$$= \frac{1}{2}$$

Case II

$$\text{Total outcome} = 6$$

$$\text{Probability} = \frac{\text{No of 4 occur}}{\text{Total outcome}}$$

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

$$\therefore \frac{1}{2} > \frac{1}{6}$$

So, Case I is more.

Q5. Probability = $\frac{\text{No. of head occur}}{\text{Total}}$

$$= \frac{200}{500}$$

$$= \frac{2}{5}$$

Q6. Total days in a week = 7

$$\text{Probability} = \frac{\text{No. of Tuesday occur}}{\text{Total}}$$

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

➔ Multiple Choice Questions

Q1. (b)

Q2. (d)

$$\frac{2 + 4 + 6 + 8 + 10}{5} = \frac{30}{5} = 6$$

Q3. (a)

$$\frac{1 + 3 + 5 + 7 + 9}{5} = \frac{25}{5} = 5$$

Q4. (d)

Q5. (a)

$$\text{Total} = 11$$

$$\text{Probability} = \frac{\text{No of M}}{\text{Total}} = \frac{2}{11}$$

Q6. (a)

$$\text{Total} = 6$$

$$\text{Probability} = \frac{\text{No of 6 occur}}{\text{Total}} = \frac{1}{6}$$



Chapter

4

Simple Equations

➔ Exercise – 4A

Q1. (a) $3x + 11 = 32$

(b) $6x - 5 = 7$

(c) $7m + 7 = 77$

(d) $\frac{b}{5} = 6$

(e) $\frac{1}{4}x - 4 = 4$

(f) $10a = 70$

Q2. (a) Taking away 5 from x gives 9.

(b) Two times m is 7.

(c) The number m divided by 5 gives 3.

(d) Five times p is 20.

(e) The sum of three times p and 4 is 25.

(f) If you subtract 2 from 4 times a number p you get 18.

Q3. (a) $x + 3 = 0$

$3 + 3 \neq 0$

No

(b) $4p - 3 = 13$

$4(1) - 3 = 13$

$4 - 3 \neq 13$

No

(c) $n + 5 = 19$

$$1 + 5 \neq 19$$

No

(d) $\frac{m}{3} = 2$

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

Yes

(e) $7n + 5 = 19$

$$7(-2) + 5 \neq 19$$

No

(f) $4p - 3 = 13$

$$4(1) - 3 \neq 13$$

No

Q4. (a) Let Raju's age be x years.

$$\text{Raju's father's age} = 3x + 5$$

$$3x + 5 = 44$$

$$3x = 44 - 5$$

$$3x = 39$$

(b) Let the base angle of the isosceles triangle be b , so
vertex angle = $2b$

$$2b + b + b = 180^\circ \quad (\text{Angle sum property of } \Delta)$$

$$4b = 180^\circ$$

(c) Let the lowest marks be x .

$$\text{Highest marks} = 2x + 7$$

$$2x + 7 = 87$$

$$2x = 87 - 7$$

$$2x = 80$$

↳ Exercise – 4B

Q1. (a) $x + 6 = 2$

$$\Rightarrow x + 6 - 6 = 2 - 6$$

$$\Rightarrow x = -4$$

(b) $y + 4 = 4$

$$\Rightarrow y + 4 - 4 = 4 - 4$$

$$\Rightarrow y = 0$$

(c) $8y = 36$

$$\Rightarrow \frac{1}{8} \times 8y = 36 \times \frac{1}{8}$$

$$\Rightarrow y = 4.5$$

(d) $\frac{a}{5} = \frac{7}{15}$

$$\Rightarrow 5 \times \frac{a}{5} = \frac{7}{15} \times 5$$

$$\Rightarrow a = \frac{7}{3}$$

(e) $\frac{20p}{3} = 40$

$$\Rightarrow \frac{3}{20} \times \frac{20p}{3} = 40 \times \frac{3}{20}$$

$$\Rightarrow p = 6$$

(f) $20t = -10$

$$\Rightarrow \frac{1}{20} \times 20t = -10 \times \frac{1}{20}$$

$$\Rightarrow t = -\frac{1}{2}$$

(g) $5m + 7 = 17$

$$\Rightarrow 5m + 7 - 7 = 17 - 7$$

$$\Rightarrow 5m = 10$$

$$\Rightarrow \frac{1}{5} \times 5m = \frac{1}{5} \times 10$$

$$\Rightarrow m = 2$$

Q2. (a) $10p + 10 = 100$

$$\Rightarrow 10p = 100 - 10$$

$$\Rightarrow 10p = 90$$

$$\Rightarrow p = \frac{90}{10} = 9$$

Check $10(a) + 10 = 90 + 10 = 100$

(b) $-\frac{p}{3} = 5$

$$\Rightarrow \frac{-p}{3} = 5$$

$$\Rightarrow p = -15$$

Check $\frac{-(-15)}{3} = 5$

(c) $3s = -9$

$$s = -\frac{9}{3}$$

$$s = -3$$

Check $3s = -9$

$$3(-3) = -9$$

(d) $2q + 6 = 0$

$$2q = -6$$

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

Check $2(-3) + 6 = 0$

$$-6 + 6 = 0$$

Q3. (a) $2y + \frac{5}{2} = \frac{37}{2}$

$$2y = \frac{37}{2} - \frac{5}{2}$$

$$2y = \frac{32}{2}$$

$$y = \frac{32}{2 \times 2}$$

$$y = 8$$

(b) $\frac{a}{5} + 3 = 2$

$$\frac{a}{5} = 2 - 3$$

$$\frac{a}{5} = -1$$

$$a = 5 \times -1$$

$$a = -5$$

(c) $\frac{5}{2}x = -5$

$$5x = -5 \times 2$$

$$5x = -10$$

$$x = \frac{-10}{5}$$

$$x = -2$$

(d) $7m + \frac{19}{2} = 13$

$$7m = 13 - \frac{19}{2}$$

$$7m = \frac{26 - 19}{2}$$

$$7m = \frac{7}{2}$$

$$m = \frac{7}{2 \times 7}$$

$$m = \frac{1}{2}$$

$$(e) \frac{2b}{3} - 5 = 3$$

$$\frac{2b}{3} = 3 + 5$$

$$\frac{2b}{3} = 8$$

$$2b = 8 \times 3$$

$$2b = 24$$

$$b = 12$$

$$\mathbf{Q4. (a)} -4(2 + x) = 8$$

$$-8 - 4x = 8$$

$$-4x = 8 + 8$$

$$-4x = 16$$

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

$$\mathbf{(b)} 3(n - 5) = 21$$

$$3n - 15 = 21$$

$$3n = 21 + 15$$

$$3n = 36$$

$$n = \frac{36}{3} = 12$$

$$\mathbf{(c)} 2(x + 4) = 12$$

$$2x + 8 = 12$$

$$2x = 12 - 8$$

$$2x = 4$$

$$x = \frac{4}{2} = 2$$

$$(d) 0 = 16 + 4(m - 6)$$

$$0 = 16 + 4m - 24$$

$$0 = -8 + 4m$$

$$8 = 4m$$

$$\frac{8}{4} = m$$

$$m = 2$$

$$(e) 4 + 5(p - 1) = 34$$

$$4 + 5p - 5 = 34$$

$$5p - 1 = 34$$

$$5p = 34 + 1$$

$$5p = 35$$

$$p = \frac{35}{5} = 7$$

$$\mathbf{Q5. (a)} 5p + 2 = 17$$

$$\Rightarrow p = 1 \quad 5(1) + 2 \neq 17$$

$$\Rightarrow p = 2 \quad 5(2) + 2 \neq 17$$

$$\Rightarrow p = 3 \quad 5(3) + 2 = 17$$

$$15 + 2 = 17$$

$$\mathbf{(b)} 3m - 14 = 4$$

$$\Rightarrow m = 1 \quad 3(1) - 14 \neq 4$$

$$\Rightarrow m = 2 \quad 3(2) - 14 \neq 4$$

$$\Rightarrow m = 3 \quad 3(3) - 14 \neq 4$$

$$\Rightarrow m = 4 \quad 3(4) - 14 \neq 4$$

$$\Rightarrow m = 5 \qquad 3(5) - 14 \neq 4$$

$$\Rightarrow m = 6 \qquad 3(6) - 14 = 4$$

$$18 - 14 = 4$$

↳ Exercise – 4C

Q1. (a) Let the number be x

$$3x - 5 = 16$$

$$3x = 16 + 5$$

$$3x = 21$$

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

$$x = 7$$

(b) Let the number be x

$$8x + 4 = 60$$

$$8x = 60 - 4$$

$$8x = 56$$

$$x = \frac{56}{8} = 7$$

(c) Let the number be x .

$$5x = x + 80$$

$$5x - x = 80$$

$$4x = 80$$

$$x = \frac{80}{4}$$

$$x = 20$$

(d) Let the number be x .

$$\frac{x}{9} = 4$$

$$x = 9 \times 4$$

$$x = 36$$

(e) Let the number be x .

$$\frac{5}{2}x - 7 = 23$$

$$\frac{5}{2}x = 23 + 7$$

$$\frac{5}{2}x = 30$$

$$x = \frac{30 \times 2}{5}$$

$$x = \frac{60}{5}$$

$$x = 12$$

Q2. (a) Let the present age of Mona be x years.

Mona's father age = $3x$

Now

$$3x + 12 = 2x$$

$$3x - 2x = 12$$

$$x = 12$$

Age of Mona is 12 years.

Age of her father is $12 \times 3 = 36$ years

(b) Let the base angle of x .

$$x + x + 40 = 180^\circ \quad (\text{Angle Sum property of triangle})$$

$$2x + 40 = 180$$

$$2x = 180 - 40$$

$$2x = 140$$

$$x = \frac{140}{2} = 70$$

(c) Let Pandy has x number of marbles.

Thus, no, of marbles with Andy = $2x$

$$\text{No. of marbles with Sandy} = \frac{(x + 2x)}{2} = \frac{3x}{2}$$

$$2x = 75 + \frac{3x}{2}$$

$$2x = \frac{(150 + 3x)}{2}$$

$$4x = 150 + 3x$$

$$x = 150$$

Thus, Pandy has 150 marbles.

$$\text{Marbles with Andy} = 2 \times 150 = 300$$

$$\begin{aligned}\text{Marbles with Sandy} &= \frac{(3 \times 150)}{2} \\ &= \frac{450}{2} \\ &= 225\end{aligned}$$

Q3. (a) Let Raju's age be x years.

$$\text{Raju's father age} = 3x + 5$$

$$3x + 5 = 44$$

$$3x = 44 - 5$$

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

$$= 13 \text{ years}$$

Raju is 13 years old.

(b) Let the breadth be b m

$$\text{Length of rectangular field} = 2b$$

$$\text{Perimeter of rectangular field} = 2(l + b)$$

$$150 = 2(2b + b)$$

$$150 = 4b + 2b$$

$$150 = 6b$$

$$\frac{150}{6} = b$$

$$25 = b$$

Breadth = 25 m

$$\text{Length} = 2b$$

$$= 2 \times 25$$

$$= 50 \text{ m}$$

► Multiple Choice Questions

Q1. (b)

$$2x - \frac{3}{2} = 5x + \frac{3}{2}$$

$$2x - 5x = \frac{3}{4} + \frac{3}{2}$$

$$-3x = \frac{3+6}{4}$$

$$-3x = \frac{9}{4}$$

$$x = \frac{9}{4 \times -3}$$

$$x = -\frac{3}{4}$$

Q2. (d)

$$\frac{y}{2} - \frac{y}{3} = 5$$

$$\frac{3y - 2y}{6} = 5$$

$$3y - 2y = 30$$

$$y = 30$$

Q3. (b)

$$x + \frac{2}{5}x = 70$$

$$\frac{5x + 2x}{5} = 70$$

$$5x + 2x = 70 \times 5$$

$$7x = \frac{70 \times 5}{7}$$

$$x = 50$$

Q4. (d)

$$2(2n + 5) = 3(3n - 10)$$

$$4n + 10 = 9n - 30$$

$$10 + 30 = 9n - 4n$$

$$40 = 5n$$

$$\frac{40}{5} = n$$

$$8 = n$$

Q5. (a)

$$n - 31 = 75 - n$$

$$n + n = 75 + 31$$

$$2n = 106$$

$$n = \frac{106}{2}$$

$$n = 53$$



Chapter

5

Lines and Angles

Exercise – 5A

Q1. (a) $90^\circ = 90^\circ - 90^\circ = 0^\circ$

(b) $80^\circ = 90^\circ - 81^\circ = 9^\circ$

(c) $27^\circ = 90^\circ - 27^\circ = 63^\circ$

(d) $9^\circ = 90^\circ - 9^\circ = 81^\circ$

Q2. (a) $99^\circ = 180^\circ - 99^\circ = 81^\circ$

(b) $170^\circ = 180^\circ - 170^\circ = 10^\circ$

(c) $111^\circ = 180^\circ - 111^\circ = 69^\circ$

(d) $63^\circ = 180^\circ - 63^\circ = 117^\circ$

(e) $95^\circ = 180^\circ - 95^\circ = 85^\circ$

Q3. Complementary = None

Supplementary = c, d, f

Neither complementary nor supplementary = a, b, e

Q4. $\angle 1 = 50^\circ$

$$\begin{aligned}\angle 3 &= 180^\circ - \angle 1 \\ &= 180^\circ - 50^\circ = 130^\circ\end{aligned}$$

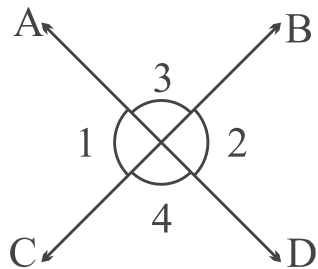
$$\begin{aligned}\angle 2 &= 180^\circ - \angle 3 \\ &= 180^\circ - 130^\circ = 50^\circ\end{aligned}$$

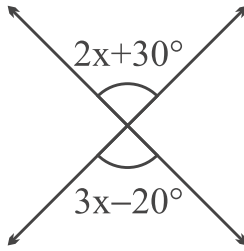
$$\angle 4 = 180^\circ - 50^\circ = 130^\circ$$

Q5. (a) $2x + 30^\circ = 3x - 20^\circ$

(vertically opposite angles)

$$50^\circ = x$$





(b) $3x - 10 + 2x - 20 = 180^\circ$ (linear pair)
 $= 5x - 30^\circ$
 $= 180^\circ$
 $5x = 30^\circ + 180^\circ = 210^\circ$
 $x = \frac{210}{5} = 42^\circ$



Q6. Ratio of two angles of the linear pair = 2 : 1

Let ratio be $2x : 1x$

$$2x + x = 180^\circ \quad (\text{Linear pair})$$

$$3x = 180^\circ$$

$$x = 60^\circ$$

So, the angles are $= 2 \times 60^\circ = 120^\circ$; $x = 60^\circ$

Q7. The angles are complementary and equal.

Then $x + x = 90^\circ$

$$2x = 90^\circ$$

$$x = 45^\circ$$

Q8. Let the equal angles be 'x'

$$x + x = 180^\circ \quad (\text{supplementary})$$

$$2x = 180^\circ$$

$$x = 90^\circ$$

Q9. $\angle DOC$, $\angle COB$; $\angle COB$, $\angle BOA$; $\angle DOB$, $\angle BOA$; $\angle DOC$,
 $\angle COA$

Q10. (a) No

(b) No

(c) No

Q11. (a) $\angle ABD + \angle CBD = 90^\circ$ (given)

$$\text{So, } 2x - 15^\circ + x - 15^\circ = 90^\circ$$

$$3x - 30^\circ = 90^\circ$$

$$3x = 120^\circ$$

$$x = 40^\circ$$

$$\text{So, } \angle CBD = x - 15^\circ = 40^\circ - 15^\circ = 25^\circ$$

(b) Supplementary of $\angle ABD$

$$\text{as } \angle ABD = (2x - 15^\circ)$$

$$(2 \times 40 - 15^\circ) = 80^\circ - 15^\circ$$

$$= 65^\circ$$

Q12. (a) 90°

(b) equal

(c) supplementary

(d) 180°

➔ Exercise – 5B

Q1. (a) $P\angle X, LMR; XLQ, LMS, PLM, RMY; QLM, SMY$

(b) $LMR, QLM; \angle MS < PLM$

(c) PLX, RMY, XLQ, SMY

(d) $PLM, LMR; QLM, LMS$

Q2. $\angle 1 = 65^\circ$ (Given)

$\angle 1 = \angle 2$ (Vertically opposite angles)

i.e., $\angle 2 = 65^\circ$

$\angle 2 = \angle 3$ (Corresponding angles)

$\angle 3 = 65^\circ$

$\angle 1 = \angle 8$ (Corresponding angles)

$\angle 8 = 65^\circ$

$$\angle 1 + \angle 5 = 180^\circ \quad (\text{linear pair are supplementary})$$

$$\angle 5 = 180^\circ - 65^\circ = 115^\circ$$

$$\angle 5 = 115^\circ$$

$$\angle 5 = \angle 7 \quad (\text{Corresponding angles})$$

$$\angle 7 = 115^\circ$$

$$\angle 5 = \angle 6 \quad (\text{Vertically opposite angles})$$

$$\angle 6 = 115^\circ$$

$$\angle 6 = \angle 4 \quad (\text{Corresponding angles})$$

$$\angle 4 = 115^\circ$$

Q3. Do yourself

Q4. In $\triangle ABC$

$$\angle A + \angle B + \angle C = 180^\circ \quad (\text{sum of all angles of a triangle})$$

$$\angle y + 60^\circ + 90^\circ = 180^\circ$$

$$\angle y = 30^\circ$$

$$\angle QAC = \angle ACB \quad (\text{Alternate interior angles})$$

i.e., $\angle z = 90^\circ$

$$\angle x + \angle y = 90^\circ \quad (\text{Complementary})$$

$$\angle x = 90^\circ - 30^\circ$$

$$\angle x = 60^\circ$$

Q5. (a) $\angle 1, \angle 4; \angle 2, \angle 3$

(b) $\angle 1, \angle 7; \angle 3, \angle 5; \angle 2, \angle 8; \angle 4, \angle 6$

(c) $\angle 1, \angle 3; \angle 2, \angle 4$

(d) $\angle 2$

(e) $\angle 6$

(f) $\angle 7, \angle 5; \angle 8, \angle 6$

(g) $\angle 1, \angle 3; \angle 2, \angle 4$

Q6. (a) $\angle a = 110^\circ$ (vertically opposite angles)

- $\angle b + \angle 110^\circ = 180^\circ$ (supplementary)
 $\angle b = 70^\circ$
- (b)** $\angle b = 130^\circ$ (vertically opposite)
 $\angle a + \angle b = 180^\circ$ (Supplementary)
 $\angle a = 180^\circ - 130^\circ = 50^\circ$
- (c)** $\angle b = 105^\circ$ (corresponding angles)
 $\angle a + \angle 105^\circ = 180^\circ$ (supplementary)
 $\angle a = 75^\circ$
- (d)** $\angle a = 70^\circ$ (Alternate interior angle)
 $\angle a + \angle b = 180^\circ$ (Supplementary)
 $\angle b = 180^\circ - 170^\circ$
 $\angle b = 110^\circ$
- Q7. (a)** $\angle x = \angle PQR$ (Alternate interior angle)
i.e., $x = 28^\circ$
- (b)** $x + 3x = 180^\circ$ (Supplementary)
 $4x = 180^\circ$
 $x = 45^\circ$
- (c)** $\angle AOC = 50^\circ$ (Alternate interior)
 So, $\angle x + \angle 50 + \angle 48 = 180^\circ$ (supplementary)
 $\angle x = 180 - 98$
 $\angle x = 82^\circ$
- Q8.** $\angle A = C$ (opposite angle)
 $\angle C = 40^\circ$
 $\angle D + \angle A = 180^\circ$ (sum of adjacent angles)
 $\angle D = 180 - 40$
 $\angle D = 140^\circ$
 $\angle D = \angle B$ (opposite angles)
 $\angle B = 140^\circ$

- Q9.** (a) True
(b) True
(c) True
(d) False
(e) True

➔ **Multiple Choice Questions**

- Q1.** (b) 180°
Q2. (c) $90 - 36 = 54^\circ$ (sum of complementary angles is $= 90^\circ$)
Q3. (b) $180 - 75 = 105^\circ$ (sum of supplementary angles is 180°)
Q4. (a) 180°
Q5. (b) supplementary
Q6. (b) Let the ratio be x

$$2x + 7x = 180^\circ$$

$$9x = 180^\circ$$

$$x = 20^\circ$$

So, angles are $40^\circ, 140^\circ$.

- Q7.** (a) 70° (Alternate interior angles)



Chapter

6

Triangle and Its Properties

↳ Exercise – 6A

Q1. $180 = x + 80$ (supplementary)

$$100 = x$$

As $80 + y = 120^\circ$ (exterior angle property)

$$y = 120^\circ - 80^\circ$$

$$= 40^\circ$$

Q2. Let the 3rd angle is x

$$65^\circ + 85^\circ + x = 180^\circ \text{ (sum of angles in } \Delta \text{)}$$

$$x = 180^\circ - 150^\circ$$

$$x = 30^\circ$$

Q3. Let the ratio be x

$$1x + 2x + 6x = 180^\circ$$

$$9x = 180^\circ$$

$$x = 20^\circ$$

So, angles are 20° , 40° , 120° . Obtuse angle triangle.

Q4. Let the equal angle be x .

$$x + 30^\circ + x = 180^\circ$$

$$2x = 150^\circ$$

$$x = 75^\circ$$

angles are 75° , 75°

Q5. The sum of angle of Δ 's are 180° .

(a) $45 + 60 + 72 = 177$

No

$$(b) 48 + 60 + 72 = 180^\circ$$

Yes

Q6. Let the another opposite angle be x and the adjacent be y .

$$\text{So, } x + 55 = 95^\circ \quad (\text{exterior angle property})$$

$$x = 40^\circ$$

$$\text{So, } \angle x + \angle y + 55 = 180^\circ \quad (\text{Angle sum})$$

$$y = 180^\circ - 95^\circ$$

$$y = 85^\circ$$

Q7. Let the ratio be x

$$\text{So, } 5x + 3x = 80^\circ \quad (\text{exterior angles})$$

$$8x = 80^\circ$$

$$x = 10^\circ$$

$$\text{and } 180^\circ - 80^\circ = 100^\circ \quad (\text{supplementary})$$

So, angles are 50° , 30° and 100° .

Q8. $2x + 3x + 4x = 180^\circ$

$$9x = 180^\circ$$

$$x = 20^\circ$$

20° , 60° , 80° .

Q9. Let the angles be x and y .

$$x + y = 40^\circ$$

$$y = 40^\circ - x$$

$$x - y = 10^\circ$$

$$x - (40^\circ - x) = 10^\circ$$

$$x - 40^\circ + x = 10^\circ$$

$$2x - 40^\circ = 10^\circ$$

$$2x = 10^\circ + 40^\circ$$

$$2x = 50^\circ$$

$$\boxed{x = 25^\circ}$$

$$25 + y = 40^\circ$$

$$y = 40^\circ - 25^\circ$$

$$\boxed{y = 15^\circ}$$

Q10. (a) $38 + x^\circ = 70^\circ$ (exterior angle)

$$x = 32^\circ$$

(b) Let $\angle PQR = y$; $\angle QPR = z$

$$110 + z = 180^\circ \quad (\text{supplementary})$$

$$z = 70^\circ$$

$$125^\circ = z + x \quad (\text{exterior angle})$$

$$x = 55^\circ$$

(c) $105 = x + 60^\circ$ (exterior angles)

$$105 - 60 = x$$

$$x = 45^\circ$$

(d) Let $\angle LNM = y$; $\angle NML = z$

$$122^\circ + y = 180^\circ \quad (\text{linear pair angles})$$

$$y = 58^\circ$$

$$130^\circ = y + x$$

$$130^\circ - 58^\circ = x$$

$$72^\circ = x$$

➔ Exercise – 6B

Q1. (a) 6, 5, 10

$$6 + 5 = 11 > 10$$

Yes

(b) 3, 5, 9

$$3 + 5 = 9$$

No

(c) 6, 7, 8

$$6 + 7 = 13 > 8$$

Yes

(d) 3, 7, 12

$$7 + 3 = 10 < 12$$

No

Q2. (a) isosceles

(b) equilateral

(c) scalene

(d) isosceles

Q3. Given $\angle DFE = \angle z = 50^\circ$

$$180 = 50 + y; \quad \text{So, } y = 130^\circ$$

$$\angle x = \angle z + 50^\circ \quad (\text{exterior angle})$$

$$\angle x = \angle 50^\circ + \angle 50^\circ = 100^\circ$$

Q4. Given $BM = MC$ (AM is a median)

In $\triangle ABM$

$$AB + BM > AM \quad \dots(i)$$

(triangle inequality property)

Also in $\triangle AMC$

$$AC + CM > AM \quad \dots(ii)$$

Adding (i) and (ii), we have

$$AB + AC + BM + CM > 2AM$$

$$AB + AC + BC > 2AM$$

Q5. $H = 15$ cm; $b = 12$ cm

$$H^2 = P^2 + B^2$$

$$(15)^2 = (P)^2 + (12)^2$$

$$225 - 144 = (P)^2$$

$$81 = (P)^2$$

$$9 = P$$

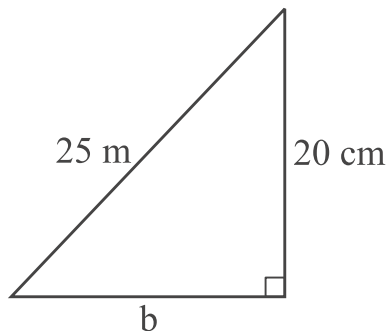
So, perpendicular = 9 cm

Q6. $(25)^2 = (20)^2 + (b)^2$

$$625 = 400 + b^2$$

$$225 = b^2$$

$$15 = b$$



i.e., the distance of the foot of the ladder from the building

$b = 15$ cm.

Q7. $(AD)^2 + (DC)^2 = (AC)^2$

$$(AD)^2 = (13)^2 - (5)^2$$

$$(AD)^2 = 169 - 25$$

$$(AD)^2 = 144$$

$$AD = 12 \text{ cm}$$

$$(AD)^2 + (BD)^2 = (AB)^2$$

$$(12)^2 + (BD)^2 = (15)^2$$

$$(BD)^2 = 225 - 144$$

$$(BD)^2 = 81$$

$$BD = 9 \text{ cm}$$

Q8. $(H)^2 = (6)^2 + (8)^2$

$$(H)^2 = 36 + 64$$

$$(H)^2 = 100$$

$$H = 10 \text{ km}$$

Q9. $(PR)^2 = (PQ)^2 + (QR)^2$

$$(PR)^2 = (3)^2 + (4)^2$$

$$(PR)^2 = 9 + 16$$

$$PR = \sqrt{25}$$

$$PR = 5 \text{ m}$$

$$(TR)^2 = (TS)^2 + (RS)^2$$

$$(TR)^2 = (12)^2 + (9)^2$$

$$(TR)^2 = 225$$

$$TR = 15 \text{ m}$$

Q10. $(2)^2 + (1.5)^2 = AB^2$

$$4 + 2.25 = (AB)^2$$

$$6.25 = (AB)^2$$

$$2.5 = AB$$

So, total height is $2 + 2.5 = 4.5 \text{ m}$.

Q11. A triangle has 3 sides and they have to satisfy the following

$$|a - b| < c < (a + b)$$

length of a side must be less than the sum of other two and more than the difference between the other two.

Hence, the third side, has to be more than $(16 - 12) = 4 \text{ cm}$.

Also it has to be less than $(16 + 12) = 28 \text{ cm}$.

It is between 4 cm and 28 cm.

➔ Multiple Choice Questions

Q1. (a) 60°

Q2. (a) a scalene triangle

Q3. (a)

3, 5, 7

$$3^2 + 5^2 = 7^2$$

$$\therefore 9 + 25 = 49$$

$$34 \neq 49$$

Q4. (b) 360°

Q5. (a) hypoteneuse

Q6. (a)

$$\angle PRB = 30 + 60 = 90$$

(exterior angle)



Chapter

7

Congruence of Triangles

Exercise – 7A

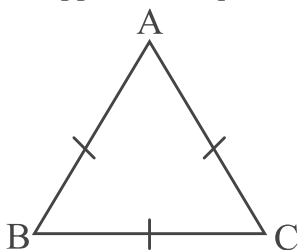
- Q1. $\angle AOC = \angle BOD$
Q2. Yes
Q3. Yes
Q4. (a) if they have the same length
(b) $m \angle A = m \angle B$
(c) 60°

Exercise – 7B

- Q1. Do yourself
Q2. In $\triangle AOC$ and $\triangle DOB$
We can use *ASA* congruence rule as
$$\angle OCA = \angle ODB = 70^\circ$$
$$AC = DB = 3 \text{ m}$$
$$\angle CAO = \angle DBO = 80^\circ$$
$$\triangle AOC \cong \triangle DOB \quad (\text{By } ASA)$$

Q3. Do yourself
Q4. $\triangle ABC$ be an equilateral triangle
 $\therefore AB = BC = AC$
(All sides of equilateral triangle are equal)
To prove : $\angle A = \angle B = \angle C = 60^\circ$
$$AB = AC$$
$$\Rightarrow \angle C = \angle B$$

(Angles opposite to equal sides are equal) ... (i)



Also $AC = BC$

$\Rightarrow \angle B = \angle A$

(Angles opposite to equal sides are equal) ... (ii)

From (i) and (ii)

$\angle A = \angle B = \angle C$... (iii)

In $\triangle ABC$

$\Rightarrow \angle A + \angle B + \angle C = 180^\circ$

$\Rightarrow \angle A + \angle A + \angle A = 180^\circ$ [From (iii)]

$$3\angle A = 180^\circ$$

$$\angle A = \frac{180^\circ}{3}$$

$$\angle A = 60^\circ$$

$\therefore \angle A = \angle B = \angle C = 60^\circ$

Q5. (a) Yes

(b) Yes

(c) Yes

Q6. Yes, by *SAS* congruence rule

Q7. (a) $\triangle ABC \cong \triangle XYZ$

So, $\angle P = 40^\circ$ and $\angle p = 25^\circ$

Q8. $x = 6, z = 8$

Q9. Do yourself

Q10. (a) Yes

(b) $AC, CA; DC, BA; \angle OCA, \angle BAC$

(c) $\angle ACB$

(d) Yes

➔ **Multiple Choice Questions**

Q1. (d)

Q2. (a)

Q3. (b)

Q4. (a)



Chapter

8

Comparing Quantities

Exercise – 8A

Q1. (a) 10 m to 25 cm

$$1 \text{ m} = 100 \text{ cm}$$

$$10 \text{ m} = 1000 \text{ cm}$$

$$\text{Ratio} = \frac{1000}{25} = \frac{40}{1}$$

(b) 15 kg to 210 kg

$$\frac{15 \div 3}{210 \div 3} = \frac{5 \div 5}{70 \div 5} = \frac{1}{14} \quad \text{or} \quad 1:14$$

(c) 8 minutes to 120 seconds

$$1 \text{ minute} = 60 \text{ seconds}$$

$$8 \times 60 = 480$$

$$\frac{480}{120} = \frac{4}{1} = 4:1$$

(d) 21 days to 2 weeks

$$1 \text{ week} = 7 \text{ days}$$

$$2 \text{ weeks} = 14 \text{ days}$$

$$\frac{21 \div 7}{14 \div 7} = \frac{3}{2} = 3:2$$

Q2. Total 35; Passed = 30; failed = 5

(a) $\frac{30}{35}$ or 6 : 7

(b) $\frac{30}{35}$ or 6 : 1

(c) $\frac{5}{30}$ or 1 : 6

(d) $\frac{5}{35}$ or 1 : 7

Q3. (a) $\frac{91 \div 13}{52 \div 13} = \frac{7}{4}$

(b) $\frac{225 \div 75}{375 \div 75} = \frac{3}{5}$

(c) $\frac{900 \div 300}{2100 \div 300} = \frac{3}{7}$

(d) $\frac{250}{2000} \div \frac{250}{250} = \frac{1}{8}$

(e) $\frac{186 \div 31}{403 \div 31} = \frac{6}{13}$

(f) $\frac{384 \div 128}{640 \div 128} = \frac{3}{5}$

Q4. (a) $\frac{3}{4}$ or $\frac{4}{5}$

$$\frac{3 \times 5}{4 \times 5} \text{ and } \frac{4 \times 4}{5 \times 4}$$

$$= \frac{15}{20} < \frac{16}{20}$$

So, $\frac{4}{5}$ is greater.

(b) $\frac{21}{24}$ or $\frac{5}{18}$

$$\frac{21 \times 3}{24 \times 3} = \frac{63}{72} \quad \square \quad \frac{5 \times 4}{18 \times 4} = \frac{20}{72}$$

$$\frac{63}{72} > \frac{20}{72}$$

So, $\frac{21}{24}$ is greater.

(c) $\frac{17}{21}$ or $\frac{9}{14}$

$$\frac{17 \times 2}{21 \times 2} = \frac{34}{42} \quad \square \quad \frac{9 \times 3}{14 \times 3} = \frac{27}{42}$$

$$\frac{34}{42} > \frac{27}{42}$$

So, $\frac{17}{21}$ is greater.

Q5. Let Khushboo got ₹ x
then honey got = $1250 - x$

$$\frac{x}{250 - x} = \frac{2}{3}$$

$$3x = 2500 - 2x$$

$$5x = 2500$$

$$x = 500$$

$$1250 - 500 = 750$$

$$500, 750$$

Q6. Anuj income = ₹ 5000

spend = ₹ 4500

save = ₹ 500

(a) $\frac{5000}{6000} = \frac{5}{6}$

(b) $\frac{500}{1500} = \frac{1}{3}$

(c) $\frac{5000}{500} = \frac{10}{1}$

Amol income = ₹ 6000

spend = ₹ 4500

save = ₹ 1500

$$(d) \frac{6000}{1500} = \frac{4}{1}$$

Q7. Width = 30 m

$$\frac{\text{length}}{30} = \frac{5}{2} \Rightarrow \text{length} = \frac{5 \times 30}{2}$$

$$\text{Length} = 5 \times 15 = 75 \text{ m}$$

Q8. Let the ratio be $3x, 2x, 1x$

$$3x + 2x + x = 36$$

$$6x = 36$$

$$x = 6$$

So, sides are $3 \times 6, 3 \times 6, 3 \times 1 = 18, 12, 3$ cms

Q9. $12 : x :: 8 : 14$

$$\frac{12}{x} = \frac{8}{14}$$

$$\frac{12 \times 14}{8} = x$$

$$x = 21$$

Q10. $\frac{3}{x} = \frac{x}{12}$

$$36 = x^2$$

$$x = 6$$

➔ Exercise – 8B

Q1. (a) Worker earn in 15 months = ₹ 18000

$$1 \text{ month} = \frac{18000}{15}$$

$$7 \text{ months} = \frac{18000}{15} \times 7$$

$$= ₹ 8400$$

(b) ₹ 18000 earn in = 15 months

$$\text{₹ 1 earn} = \frac{15}{18000}$$

$$\text{₹ 30,000 earn} = \frac{15}{18000} \times 30000$$

$$= 25 \text{ months}$$

Q2. Total weight = 40×25

$$= 1000 \text{ kg}$$

$$1000 \text{ kg weight cost} = \text{₹ } 2750$$

$$1 \text{ kg weight cost} = \frac{2750}{1000}$$

$$\text{As total weight} = 35 \times 50$$

$$= 1750 \text{ kg}$$

$$1750 \text{ kg weight cost} = \frac{2750}{1000} \times 1750$$

$$= 4812.5$$

Q3. Car travels

$$600 \text{ km} = 8 \text{ hours}$$

$$1 \text{ km} = \frac{8}{600}$$

$$850 \text{ km} = \frac{8}{600} \times 850$$

$$= \frac{68}{60}$$

$$11\frac{1}{3} \text{ hours or } 11 \text{ hours } 20 \text{ minutes.}$$

Q4. $(A + B)$ work in 1 day = $\frac{1}{5}$

$$(A + C) \text{ work in 1 day} = \frac{1}{4}$$

$$(B + C) \text{ work in 1 day} = \frac{1}{3}$$

$$\begin{aligned} 2(A + B + C) \text{ work in 1 day} &= \frac{1}{5} + \frac{1}{4} + \frac{1}{3} \\ &= \frac{12 + 15 + 20}{60} \\ &= \frac{47}{60} \end{aligned}$$

$$(A + B + C) \text{ work in day} = \frac{47}{60} \times \frac{1}{2} = \frac{47}{120}$$

$$[(A + B + C) - (B + C)] \text{ work in 1 day} = \frac{47}{120} - \frac{1}{3}$$

$$(A + B + C - B - C) \text{ work in 1 day} = \frac{47 - 40}{120} = \frac{7}{120}$$

So, $A \text{ work in 1 day} = \frac{7}{120}$

A will complete the work in $\frac{120}{7}$ days or $17\frac{1}{7}$ days.

Q5. Given; 8 cows = 6 oxen

So, 4 cows = 30 oxen

6 oxen can eat the grass field in = 12 days

1 oxen can eat the grass field in = 12×6 days

4 cows + 9 oxen = 3 oxen + 9 oxen = 12 oxen

12 oxen can eat the grass field in = $\frac{12 \times 6}{12} = 6$ days

Q6. $(A + B + C) \text{ work in 1 day} = \frac{1}{15}$

$$B \text{ work in 1 day} = \frac{1}{30}$$

$$C \text{ work in 1 day} = \frac{1}{40}$$

$$(A + B + C) - (B + C) \text{ work in 1 day} = \frac{1}{15} - \left(\frac{1}{30} + \frac{1}{40} \right)$$

$$\begin{aligned} \text{or} \quad A \text{ work in 1 day} &= \frac{8 - (4 + 3)}{120} \\ &= \frac{1}{120} \end{aligned}$$

So, A will complete the work in 120 days.

Q7. 20 men will complete the remaining work in
 $= 10 - 3 = 7$ days

1 men will complete the remaining work in
 $= (20 \times 7)$ days

$20 - 5 = 15$ men will complete the remaining work in
 $= \frac{20 \times 7}{15}$
 $= \frac{28}{3}$
 $= 9\frac{1}{3}$ days

Q8.

x	4	p	6
y	10	20	q

As per statement x and y are in the direct proportion.

$$\text{So, } \frac{4}{10} = \frac{p}{20}$$

$$4 \times 20 = p \times 10$$

$$p = \frac{4 \times 20}{10} = 8$$

$$\text{Also, } \frac{8}{20} = \frac{6}{q}$$

$$8 \times q = 6 \times 20$$
$$q = \frac{6 \times 20}{8} = 15$$

So, $p = 8$ and $q = 15$.

➔ **Exercise – 8C**

Q1. (a) $12\frac{1}{2}\%$ of 64

$$\frac{25 \times 64}{2 \times 100} = 8$$

(b) 75% of 400

$$\frac{75}{100} \times 400 = 300$$

Q2. (a) $\frac{25}{100} \times 100 = 25$ students

(b) $\frac{20}{100} \times 80 = 16$ men

Q3. (a) ₹ 4 of ₹ 40

$$\frac{4}{40} \times 100 = 10\%$$

(b) 12 minutes of 1 hour or 60 minutes

$$\frac{12}{60} \times 100 = 20\%$$

(c) students of 25 students

$$\frac{5}{15} \times 100 = 20\%$$

(d) 3 months of 12 months

$$\frac{3}{12} \times 100 = 25\%$$

Q4. (a) ₹ 500 is ₹ 600

$$\frac{600}{500} \times 100 = 120\%$$

(b) 80 m is 24 m

$$\frac{24}{80} \times 100 = 30\%$$

(c) 45 kg is 90 kg

$$\frac{90}{45} \times 100 = 200\%$$

(d) 30 km is 7.5 km

$$\frac{7.5}{30} \times 100 = 25\%$$

Q5. (a) $\frac{2}{3} \times 100 = \frac{200}{3} = 66\frac{2}{3}\%$

$$\begin{array}{r} 3 \overline{) 200} \quad (33 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

(b) $\frac{11}{6} \times 100 = \frac{550}{3} = 183\frac{1}{3}\%$

(c) $\frac{17}{15} \times 100 = \frac{340}{3} = 113\frac{1}{3}\%$

Q6. (a) $\frac{5}{7} \times \frac{100}{1} = \frac{500}{7} = 71\frac{3}{7}\%$

(b) $\frac{9}{2} \times \frac{100}{1} = \frac{900}{2} = 450\%$

(c) $\frac{11}{6} \times 100 = \frac{550}{3} = 183\frac{1}{3}\%$

Q7. $\frac{42}{48} \times 100 = \frac{175}{2} = 87\frac{1}{2}\%$

Q8. (a) $\frac{24}{100} \times 100 = 24\%$

(b) $\frac{275}{1000} \times \frac{100}{1} = 27.5\%$

Q9. $\frac{84}{70} \times 100 = 120$

Q10. (a) $\frac{136}{100} = 1\frac{9}{25}$

(b) $\frac{400}{100} = 4$

➔ **Exercise – 8D**

Q1. $\frac{60}{100} \times 2500 = 1500$ boys

$= 2500 - 1500$

$= 1000$ girls

Q2. Airline ticket costs = ₹ 12800

$$\text{Tax} = 12800 \times \frac{5}{100} = ₹ 640$$

Total Costs = 12800 + 640

$= ₹ 13440$

Q3. Increase in population = 56000 – 48000 = 8000

Original population = 48000

Increase = 800

Percentage of increase = $\frac{8000}{48000} \times 100$

$= \frac{50}{3}$ or $16\frac{2}{3}\%$

$= 16\frac{2}{3}\%$

Q4. decrease in price = ₹ 9000 – ₹ 7500 = ₹ 1500

$$\begin{aligned}\% \text{ decrease} &= \frac{1500}{9000} \times 100 \\ &= \frac{50}{3} = 16\frac{2}{3}\%\end{aligned}$$

Q5. $\frac{20}{100} \times 2400 = 480$ gm ghee
 $\frac{30}{100} \times 2400 = 720$ gm sugar
 $\frac{50}{100} \times 2400 = 1200$ gm besan

So, we used 480 gm ghee, 720 gm sugar and 1200 gm besan.

Q6. Increase in salary = ₹ 15000 – ₹ 12000 = ₹ 3000
 So, $\% \text{ increase} = \frac{3000}{12000} \times 100 = 25\%$

➔ **Exercise – 8E**

Q1. C.P. = ₹ 7500; S.P. = ₹ 6600
 Loss = ₹ 7500 – ₹ 6600 = ₹ 900
 $\text{Loss \%} = \frac{\text{Loss} \times 100}{\text{C.P.}}$
 $= \frac{900 \times 100}{7500}$
 $= 12\%$

Q2. Let S.P. of 10 eggs = x
 1 egg = $\frac{x}{10}$
 C.P. of 12 eggs is x g.
 C.P. of 1 egg is = $\frac{x}{12}$
 Profit = $\frac{x}{10} - \frac{x}{12}$

$$= \frac{x(6-5)}{60}$$

$$= \frac{x}{60}$$

$$\text{Profit \%} = \frac{\frac{x}{60} \times 100}{\frac{x}{12}}$$

$$= \frac{100x \times 12}{60 \times x}$$

$$= 20\%$$

Q3. Total C.P. = ₹ 1215 + ₹ 35 = ₹ 1250

$$16\% = \frac{P \times 100}{\text{C.P.}}$$

$$\frac{16 \times 1250}{100} = P$$

$$P = 200$$

$$\text{S.P.} - \text{C.P.} = P$$

$$\text{S.P.} = P + \text{C.P.}$$

$$= ₹ 200 + ₹ 1250$$

$$= ₹ 1450$$

Q4. For Anil; C.P. = ₹ 200; $P = 20\%$

$$\text{S.P.} = \frac{\text{C.P.} \times (100 + P\%)}{100}$$

$$\text{S.P.} = \frac{(100 + 20)}{100} \times \frac{\text{C.P.}}{1}$$

$$\text{S.P.} = \frac{120}{100} \times 200$$

$$\text{S.P.} = ₹ 240$$

S.P. of Anil is C.P. to Ajay = ₹ 240

For Ajay

$$\begin{aligned}\text{S.P.} &= \frac{(100 - L\%)}{100} \times \text{C.P.} \\ &= \frac{(100 - 10)}{100} \times 240 \\ &= \frac{90}{100} \times 240 \\ &= 9 \times 24 \\ &= ₹ 216\end{aligned}$$

So, Atul pay ₹ 216 for this book.

- Q5.** Let the shopkeeper buys greeting cards of first kind 300 and second kind 300.

$$\text{So, C.P. of first kind} = \frac{20}{25} \times \frac{300}{1} = ₹ 240$$

$$\text{So, C.P. of second kind} = \frac{20}{15} \times \frac{300}{1} = ₹ 400$$

$$\begin{aligned}\text{So, total cost price for } (300 + 300) = 600 \text{ greeting cards} \\ &= 240 + 400 = ₹ 640\end{aligned}$$

$$\text{S.P. for 600 greeting cards} = \frac{20}{20} \times \frac{600}{1} = ₹ 600$$

$$\text{So, loss} = ₹ 640 - 600 = ₹ 40$$

$$\begin{aligned}\text{Loss \%} &= \frac{140}{640} \times \frac{100}{1} \\ &= \frac{25}{4} \\ &= 6\frac{1}{4}\%\end{aligned}$$

- Q6.** Let the shopkeeper buys 100 pencils and 100 pens.

$$\begin{aligned}\text{Cost price of pencils} &= ₹ 1.5 \times 100 \\ &= ₹ 150\end{aligned}$$

$$\begin{aligned}\text{Cost price of pens} &= ₹ 2.25 \times 100 \\ &= ₹ 225\end{aligned}$$

$$\begin{aligned}\text{Total cost price of both} &= ₹ (150 + 225) \\ &= ₹ 375\end{aligned}$$

$$\begin{aligned}\text{S.P. (100 + 100) - 200 pens and pencils} &= 200 \times 2 \\ &= ₹ 400\end{aligned}$$

$$\begin{aligned}\text{So, Profit} &= ₹ (400 - 375) \\ &= ₹ 25\end{aligned}$$

$$\text{Profit \%} = \frac{25}{375} \times \frac{100}{1} = \frac{20}{3} \text{ or } 6\frac{2}{3} \%$$

► Exercise – 8F

Q1. $P = ₹ 15000$; $R = 5\%$; $T = 3$ years

$$\begin{aligned}\text{S.I.} &= \frac{P \times R \times T}{100} \\ &= \frac{15000 \times 5 \times 3}{100}\end{aligned}$$

$$\text{S.I.} = ₹ 2250$$

$$\begin{aligned}A &= ₹ (15000 + 2250) \\ &= ₹ 17250\end{aligned}$$

Q2. $A = ₹ 4130$

$$A = (\text{S.I.} + P)$$

$$\begin{aligned}\text{S.I.} &= \frac{P \times R \times T}{100} \\ &= \frac{3500 \times R \times 2}{100}\end{aligned}$$

$$= 70R$$

$$4130 = 70R + 3500$$

$$\frac{630}{70} = R$$

$$R = 9\%$$

$$\text{Q3. } P = 25000; \quad T = 4; \quad R = 9\%$$

$$\text{S.I.} = \frac{25000 \times 4 \times 9}{100}$$

$$= ₹ 9000$$

$$A = (\text{S.I.} + P)$$

$$= ₹ (9000 + 25000)$$

$$= ₹ 34000$$

$$\text{Q4. } P = 640; \quad A = 768$$

$$\text{S.I.} = (A - P)$$

$$= (768 - 640)$$

$$= ₹ 128$$

$$T = \frac{5}{2}$$

$$\text{S.I.} = \frac{P \times R \times T}{100}$$

$$128 = \frac{640 \times R \times \frac{5}{2}}{100}$$

$$\frac{2 \times 12800}{5 \times 640} = R$$

$$R = 8\%$$

$$\text{Then, } R = 8\%; \quad A = 686; \quad T = 3 \text{ years}$$

$$\text{S.I.} = \frac{P \times 8 \times 3}{100}$$

$$= 0.24P$$

$$A = P + \text{S.I.}$$

$$686 = P + 0.24P$$

$$686 = 1.24P$$

$$\frac{868}{1.24} = P$$

$$P = ₹ 700$$

Q5. Principal + 6 years simple interest = ₹ 5112

Principal + $\frac{9}{2}$ years simple interest = ₹ 4734

$\frac{3}{2}$ years simple interest = ₹ 378

$$1 \text{ year simple interest} = \frac{378 \times 2}{3}$$

$$= 252$$

6 years simple interest = $252 \times 6 = ₹ 1512$

Amount = ₹ 5112

S.I. = ₹ 1512

Principal = ₹ 3600

S.I. = ₹ 1512

Time = 6 years

$$\text{Rate} = \frac{\text{S.I.} \times 100}{P \times T}$$

$$= \frac{1512 \times 100}{3600 \times 6}$$

$$= 7\%$$

So, Principal = ₹ 3600

Q6. Let the principal be = ₹ 100

$$\text{Amount} = 2 \times 100$$

$$= ₹ 200$$

So, Simple interest = ₹ 200 – ₹ 100

$$= ₹ 100$$

$$\text{Time} = 12 \frac{1}{2} \text{ years} = \frac{25}{2} \text{ years}$$

$$\begin{aligned} \text{Rate} &= \frac{\text{S.I.} \times 100}{P \times T} \\ &= \frac{100 \times 100}{100 \times \frac{25}{2}} \\ &= \frac{100 \times 100 \times 2}{100 \times 25} \\ &= 8\% \end{aligned}$$

Now principal = ₹ 100

$$\text{Amount} = 3 \times 100 = ₹ 300$$

Simple interest = ₹ (300 – 100) = ₹ 200

$$\text{Rate} = 8\%$$

$$\begin{aligned} \text{Time} &= \frac{\text{S.I.} \times 100}{P \times R} \\ &= \frac{200 \times 100}{100 \times 8} \\ &= 25 \text{ years} \end{aligned}$$

➔ Multiple Choice Questions

Q1. (b)

$$\frac{8}{x} = \frac{3}{9}$$

$$24 = x$$

Q2. (a)

$$1 \text{ m} = 100 \text{ cm}$$

$$\frac{1000}{25} = \frac{40}{1} \quad \text{or} \quad 40 : 1$$

Q3. (b) A car goes

$$300 \text{ km in} = 25 \text{ l}$$

$$\text{or in 25 litres} = 300 \text{ km}$$

$$\text{in 1 litre} = \frac{300}{25} \text{ km}$$

$$\begin{aligned}\text{in 80 litres} &= \frac{300}{25} \times 80 \\ &= 960 \text{ km}\end{aligned}$$

Q4. (b)

$$9 \text{ kg} = 72 \text{ books}$$

$$1 \text{ kg} = \frac{72}{9}$$

$$6 \text{ kg} = 8 \times 6 = 48 \text{ books}$$

Q5. (b) $\frac{8}{160} \times 100 = 5\%$

Q6. (a) $\frac{30}{75} \times 100 = \frac{3000}{45} = 40$

Q7. (b) C.P. = 500 Gain = 5%

$$\text{S.P.} = \frac{(100 \times G\%)}{100} \times \frac{\text{C.P.}}{1}$$

$$= \frac{105}{100} \times 500$$

$$= ₹ 525$$

Q8. (a) 12 for ₹ 10

$$\text{C.P. 12 for ₹ 10}$$

$$1 \text{ for ₹ } \frac{10}{12} \text{ or } \frac{5}{6}$$

$$\text{S.P. 4 for ₹ 5}$$

$$1 \text{ for ₹ } \frac{5}{4}$$

as S.P. > C.P.

$$\text{So, Gain} = ₹ \left(\frac{5}{4} - \frac{5}{6} \right)$$

$$\begin{aligned}
 &= \frac{5(3-2)}{12} \\
 &= ₹ \frac{5}{12} \\
 P\% &= \frac{\frac{5}{12} \times 100}{\frac{5}{6}} = \frac{5}{12} \times \frac{100 \times 6}{5} \\
 &= \frac{500 \times 6}{12 \times 5} \\
 &= 50\% \text{ gain}
 \end{aligned}$$

Q9. (b) Simple interest = $\frac{600 \times 12 \times 1}{100}$
 = ₹ 72

Q10. (c) Principal = $\frac{\text{S.I.} \times 100}{R \times T}$
 = $\frac{1020 \times 100}{4 \times 3}$
 = ₹ 8500



Chapter

9

Rational Numbers

Exercise – 9A

Q1. (a) Yes

(b) Yes

(c) Yes

(d) Yes

Q2. (a) $\frac{20}{45} = \frac{4}{9}$ as $\frac{20 \div 5}{45 \div 5}$

(b) $\frac{-16}{24} = \frac{-4}{6} = \frac{-2}{3}$ as $\frac{-16 \div 8}{24 \div 8}$

(c) $\frac{-48}{-32} = \frac{3}{2}$ as $\frac{-48 \div 16}{-32 \div 16}$

Q3. (a) $\frac{-3 \times 5}{5 \times 5}, \frac{-3 \times 6}{5 \times 6}, \frac{-3 \times 7}{5 \times 7}, \frac{-3 \times 8}{5 \times 8}$
 $= \frac{-15}{25}, \frac{-18}{30}, \frac{-21}{35}, \frac{-24}{40}$

(b) $\frac{2 \times 4}{-3 \times 4}, \frac{2 \times 5}{-3 \times 5}, \frac{2 \times 6}{-3 \times 6}, \frac{2 \times 7}{-3 \times 7}$
 $= \frac{8}{-12}, \frac{10}{-15}, \frac{12}{-18}, \frac{14}{-21}$

(c) $\frac{1 \times 5}{-6 \times 5}, \frac{1 \times 6}{-6 \times 6}, \frac{1 \times 7}{-6 \times 7}, \frac{1 \times 8}{-6 \times 8}$
 $= \frac{5}{-30}, \frac{6}{-36}, \frac{7}{-42}, \frac{8}{-48}$

$$(d) \frac{-1 \times 4}{4 \times 4}, \frac{-1 \times 5}{4 \times 5}, \frac{-1 \times 6}{4 \times 6}, \frac{-1 \times 7}{4 \times 7}$$

$$= \frac{-4}{16}, \frac{-5}{20}, \frac{-6}{24}, \frac{-7}{28}$$

Q4. (a) $\frac{-5}{-9} \times \frac{5}{-9} = 45 \neq -45$; No

(b) $\frac{7}{8} \times \frac{-5}{16} = -40 \neq 112$; No

(c) $\frac{5}{7} \times \frac{15}{21} = 105 = 105$; Yes

(d) $\frac{1}{3} \times \frac{-4}{12} = 12 \neq -12$; No

Q5. (a) $\frac{4}{9} = \frac{8}{18}, \frac{12}{27}, \frac{16}{36}$

(b) $\frac{7}{-9} = \frac{14}{-18}, \frac{21}{-27}, \frac{28}{-36}$

(c) $\frac{5}{-3} = \frac{10}{-6}, \frac{15}{-9}, \frac{20}{-12}$

(d) $\frac{4}{5} = \frac{8}{10}, \frac{12}{15}, \frac{16}{20}$

Q6. (a) $\frac{-7}{16} = \frac{x}{64}$

$$\frac{-7}{16} \times \frac{4}{4} = \frac{-28}{64} \quad \text{as} \quad x = -28$$

$$\text{or } 16 \times x = -7 \times 64, \quad x = \frac{-7 \times 64}{16} = -28$$

(b) $\frac{5}{8} = \frac{40}{x}$

$$5x = 40 \times 8$$

$$x = \frac{40 \times 8}{5} = 64$$

$$(c) \frac{x}{9} = \frac{3}{27}$$

$$x = \frac{1}{9} \times \frac{9}{1} = 1$$

Q7. (a) Let us write -1 and 0 as rational numbers with denominator 6 .

$$\Rightarrow -1 = \frac{-6}{6} \quad \text{and} \quad 0 = \frac{0}{6}$$

$$\therefore \frac{-6}{6} < \frac{-5}{6} < \frac{-4}{6} < \frac{-3}{6} < \frac{-2}{6} < \frac{-1}{6} < 0$$

$$\Rightarrow -1 < \frac{-5}{6} < \frac{-2}{3} < \frac{-1}{2} < \frac{-1}{3} < \frac{-1}{6} < 0$$

\therefore five rational numbers between -1 and 0 would be

$$\frac{-5}{6}, \frac{-2}{3}, \frac{-1}{2}, \frac{-1}{3}, \frac{-1}{6}$$

(b) Do yourself

$$(c) \frac{-4}{5} \text{ and } \frac{-2}{3}$$

Let us write $\frac{-4}{5}$ and $\frac{-2}{3}$ as rational numbers with the same

denominators.

$$\Rightarrow \frac{-4}{5} = \frac{-36}{45} \quad \text{and} \quad \frac{-2}{3} = \frac{-30}{45}$$

$$\therefore \frac{-36}{45} < \frac{-35}{45} < \frac{-34}{45} < \frac{-33}{45} < \frac{-32}{45} < \frac{-31}{45} < \frac{-30}{45}$$

$$\Rightarrow \frac{-4}{5} < \frac{-7}{9} < \frac{-34}{45} < \frac{-11}{15} < \frac{-32}{45} < \frac{-31}{45} < \frac{-2}{3}$$

\therefore five rational numbers between $\frac{-4}{5}$ and $\frac{-2}{3}$ are :

$$\frac{-7}{9}, \frac{-34}{45}, \frac{-11}{15}, \frac{-32}{45}, \frac{-31}{45}, \frac{-2}{3}$$

(d) Do yourself

Q8. Do yourself

Q9. (a) $0 > \frac{-7}{6}$

(b) $\frac{3 \times 12}{5 \times 12} = \frac{36}{60}$ and $\frac{7 \times 5}{12 \times 5} = \frac{35}{60}$

Since $\frac{36}{60} > \frac{35}{60}$

$\therefore \frac{3}{5} > \frac{7}{12}$

(c) $\frac{3 \times 13}{7 \times 13} = \frac{39}{91}$ and $\frac{-6 \times 7}{13 \times 7} = \frac{-42}{91}$

Since $\frac{39}{91} > \frac{-42}{91}$

$\therefore \frac{3}{7} > \frac{-6}{12}$

(d) $\frac{-7}{9} = \frac{-7}{9}$

Q10. (a) $\frac{-5 \times 1}{6 \times 1} = \frac{-5}{6}$ and $\frac{-4 \times 2}{3 \times 2} = \frac{-8}{6}$

Since, $\frac{-5}{6} > \frac{-8}{6}$

$\therefore \frac{-5}{6} > \frac{-4}{3}$

(b) $\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$ and $\frac{1 \times 2}{3 \times 2} = \frac{2}{6}$

Since, $\frac{3}{6} > \frac{2}{6}$

$\therefore \frac{1}{2} > \frac{1}{3}$

$$(c) \frac{-8 \times 8}{9 \times 8} = \frac{-64}{72} \quad \text{and} \quad \frac{-9 \times 9}{8 \times 9} = \frac{-81}{72}$$

$$\text{Since,} \quad \frac{-64}{72} > \frac{-81}{72}$$

$$\therefore \frac{-8}{9} > \frac{-9}{8}$$

$$(d) -3\frac{2}{7} = \frac{-23}{7} = \frac{-23 \times 5}{7 \times 5} = \frac{-115}{35}$$

$$\text{and} \quad -3\frac{4}{5} = \frac{-19}{5} = \frac{-19 \times 7}{5 \times 7} = \frac{-133}{35}$$

$$\text{Since,} \quad \frac{-115}{35} > \frac{-133}{35}$$

$$\therefore -3\frac{2}{7} > -3\frac{4}{5}$$

$$\text{Q11. (a) } \frac{-3}{5} < \frac{-2}{5} < \frac{-1}{5}$$

$$(b) \frac{4}{7}, \frac{2}{5}, \frac{3}{1}, \frac{11}{14}$$

$$\Rightarrow \frac{40}{70}, \frac{28}{70}, \frac{210}{70}, \frac{55}{70} \quad (\text{same denominator})$$

$$\text{Now } \frac{28}{70} < \frac{40}{70}, \frac{55}{70}, \frac{210}{70}$$

$$\Rightarrow \frac{2}{5} < \frac{4}{7} < \frac{11}{14} < 3$$

$$(c) \frac{1}{3}, \frac{-2}{9}, \frac{-4}{3}$$

$$\Rightarrow \frac{3}{9}, \frac{-2}{9}, \frac{-12}{9}$$

$$\text{Now, } \frac{-12}{9} < \frac{-2}{9} < \frac{3}{9}$$

(Converting into same denominator)

$$= \frac{-4}{3} < \frac{-2}{9} < \frac{1}{3}$$

Q12. (a) $\frac{-1}{5}, \frac{-1}{6}, \frac{2}{3}, \frac{4}{10}$

$$\Rightarrow \frac{-6}{30}, \frac{-5}{30}, \frac{20}{30}, \frac{12}{30}$$

Now $\frac{20}{30} > \frac{12}{30}, \frac{-5}{30}, \frac{-6}{30}$

$$\Rightarrow \frac{2}{3} > \frac{4}{10} > \frac{-1}{6} > \frac{-1}{5}$$

(b) $\frac{7}{11}, \frac{-3}{5}, \frac{-2}{3}$

$$\Rightarrow \frac{105}{165}, \frac{-99}{165}, \frac{-110}{165}$$

$$\Rightarrow \frac{105}{165} > \frac{-99}{165} > \frac{-110}{165}$$

$$\Rightarrow \frac{7}{11} > \frac{-3}{5} > \frac{-2}{3}$$

↳ Exercise – 9B

Q1. (a) $\frac{-3}{8} + \frac{4}{5} = \frac{-15 + 32}{40} = \frac{17}{40}$

(b) $\frac{1}{17}$ and $\frac{-16}{17} = \frac{7 - 16}{17} = \frac{-9}{17}$

(c) $\frac{2}{9}$ and $\frac{9}{2} = \frac{2 \times 2 + 9 \times 9}{18} = \frac{4 + 81}{18} = \frac{85}{18}$

(d) $\frac{-4}{9}, \frac{-5}{12}$ and $\frac{11}{18} = \frac{-4}{9} - \frac{-5}{12} + \frac{11}{18}$
 $= \frac{-16 - 15 + 22}{36} = \frac{-9}{36} = \frac{-1}{4}$

Q2. (a) $\frac{-3}{4}$ from $\frac{-2}{3} = \frac{-2}{3} + \frac{3}{4} = \frac{-8 + 9}{12} = \frac{1}{12}$

$$(b) \frac{-6}{11} \text{ from } \frac{15}{7} = \frac{15}{7} + \frac{6}{11} = \frac{165 + 42}{77} = \frac{207}{77}$$

$$(c) \frac{1}{4} \text{ from } \frac{17}{12} = \frac{17}{12} - \frac{1}{4} = \frac{17 - 3}{12} = \frac{14}{12} = \frac{7}{6}$$

$$(d) \left[\left(\frac{-5}{7} \right) + \left(\frac{-7}{9} \right) \right] - \frac{9}{11}$$

$$\begin{aligned} & \left[\left(\frac{-5}{7} \right) + \left(\frac{-7}{9} \right) \right] - \frac{9}{11} = \left[\frac{-45 - 49}{63} \right] - \frac{9}{11} \\ & \frac{-94}{63} - \frac{9}{11} = \frac{-1034 - 567}{693} = \frac{-1601}{693} \end{aligned}$$

Q3. Let the added number be 'a'

$$\frac{2}{3} + a = \frac{-100}{33}$$

$$a = \frac{-100}{33} - \frac{2}{3}$$

$$= \frac{-100 - 22}{33} = \frac{-122}{33}$$

Q4. Let the subtracted one be 'b'

$$\frac{13}{14} - b = \frac{13}{14}$$

$$-b = \frac{13}{14} - \frac{13}{14} = 0$$

$$b = 0$$

Q5. Let one be 'a'

$$\frac{-1}{9} + a = -8$$

$$a = -8 + \frac{1}{9}$$

$$= \frac{-72 + 1}{9}$$

$$a = \frac{-71}{9}$$

Q6. (a) On LHS $\frac{13}{10} - \frac{7}{15} = \frac{(13 \times 3) + (-7 \times 2)}{30} = \frac{-14 + 39}{30}$

$$= \frac{+25}{30} \div \frac{5}{5} = \frac{+5}{6}$$

and on RHS $\frac{-7}{15} + \frac{13}{10} = \frac{-14 + 39}{30} = \frac{+25}{30} \div \frac{5}{5} = \frac{5}{6}$

\therefore LHS = RHS (hence verified)

(b) On LHS $\frac{-3}{4} + \frac{17}{8} + \frac{-1}{2} = \frac{-3 \times 2 + 17 - 4}{8} = \frac{7}{8}$

On RHS $\frac{-1}{2} - \frac{3}{4} + \frac{17}{8} = \frac{-4 - 6 + 17}{8} = \frac{7}{8}$

\therefore LHS = RHS (Hence verified)

Q7. $\frac{7}{9} - \frac{5}{12} = \frac{28 - 15}{36} = \frac{13}{36} - \left(\frac{-5}{12} + \frac{7}{9} \right)$

$$= \frac{13}{36} - \frac{13}{36} = 0$$

➔ Exercise – 9C

Q1. (a) $\frac{15}{4} \times \frac{4}{7} = \frac{15 \times 4}{4 \times 7}$

$$= \frac{60}{28} = \frac{15}{7}$$

(b) $\frac{8}{1} \times \frac{-2}{6} = \frac{-16}{9}$

(c) $\frac{-3}{5} \times \frac{-14}{6} = \frac{+14}{10} = \frac{7}{5}$

(d) $\frac{7}{2} \times \frac{14}{5} \times \frac{2}{7} = \frac{14}{5}$

Q2. (a) 1

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

$$(c) \frac{-11}{-20} = \frac{-20}{-11}$$

$$(d) \frac{13}{5} = \frac{5}{13}$$

$$\begin{aligned} \text{Q3. (a)} \quad \frac{-4}{9} \div \frac{10}{27} &= \frac{-4 \times 27}{9 \times 10} \\ &= \frac{-6}{5} \end{aligned}$$

$$\begin{aligned} (b) \quad \frac{-5}{17} \div \frac{-3}{170} &= \frac{-5}{17} \times \frac{170}{-3} \\ &= \frac{+50}{+3} = \frac{50}{3} \end{aligned}$$

$$\begin{aligned} (c) \quad \frac{11}{2} \div \left(\frac{30}{-5} \right) &= \frac{11 \times -5}{2 \times 30} \\ &= \frac{-11}{12} \end{aligned}$$

$$\begin{aligned} (d) \quad \frac{8}{15} \div \frac{3}{5} &= \frac{8}{15} \times \frac{5}{3} \\ &= \frac{8}{9} \end{aligned}$$

Q4. Let one of them of 'x'

$$x \times -1 = \frac{-8}{15}$$

$$\Rightarrow x = \frac{-8}{15 \times -1}$$

$$x = \frac{8}{15}$$

$$\text{Q5. (a)} \quad \left[\frac{35}{6} \times \frac{-3}{7} \right] - \left[\frac{3}{8} \times \frac{-32}{9} \right]$$

$$\Rightarrow \frac{-5}{2} + \frac{4}{3}$$

$$\Rightarrow \frac{-15+8}{6} = \frac{-7}{6}$$

$$(b) \left[\frac{-28}{27} \right] \div \left[\frac{-5}{9} \right]$$

$$\Rightarrow \frac{-28}{27} \times \frac{9}{-5}$$

$$\Rightarrow \frac{28}{15}$$

$$(c) \frac{-11}{7} \times \frac{4}{14} \times \frac{21}{33} = \frac{-2}{7}$$

$$(d) \frac{7}{9} \div \left(\frac{-2}{3} \right)$$

$$\frac{7}{9} \times \frac{3}{-2} = \frac{-7}{6}$$

Q6. (a) $\frac{3}{17} \div \square = \frac{-3}{17}$

$$\frac{3}{17} \times \frac{1}{x} = \frac{-3}{17}$$

$$\frac{1}{x} = \frac{-3 \times 17}{17 \times 3} = -1$$

So, $x = -1$

(b) $\frac{-15}{2} \div x = 1$

$$\frac{-15}{2} \div \frac{1}{x} = 1$$

$$\frac{1}{x} = \frac{1 \times 2}{-15}, \quad \text{so,} \quad x = \frac{-15}{2}$$

(c) $\frac{17}{4} \div x = -1$

$$\frac{17}{4} \times \frac{1}{x} = -1$$

$$\frac{1}{x} = \frac{-1 \times 4}{17} = \frac{-4}{17} \quad \text{so,} \quad x = -\frac{17}{4}$$

$$\text{(d) } x \div (-1) = \frac{55}{22}$$

$$-x = \frac{55}{22}$$

$$x = \frac{-55}{22}$$

$$\text{Q7. } \left(\frac{17}{5} + \frac{9}{2} \right) \div 2\frac{1}{4}$$

$$\left(\frac{34 + 45}{10} \right) \div \frac{9}{4}$$

$$\frac{79}{10} \times \frac{4}{9} = \frac{158}{45}$$

► Multiple Choice Questions

$$\text{Q1. (a) } \frac{-4}{7}$$

$$\text{Q2. (c) } -3 \times 35 = 7 \times x$$

$$\frac{-3 \times 35}{7} = x$$

$$x = -15$$

$$\text{Q3. (b) } \frac{-6}{9}$$

$$\text{Q4. (a) } \frac{-3}{4} = \frac{6}{x}$$

$$\frac{-3 \times -2}{4 \times -2} = \frac{6}{-8}$$

$$= -8$$

Q5. (a) $\frac{7}{9} + x = 2$

$$x = 2 - \frac{7}{9}$$

$$x = \frac{18 - 7}{9}$$

$$x = \frac{11}{9}$$

Q6. (d) $\frac{4}{5}$

Q7. (c) $\frac{6}{5}$



Chapter

10

Practical Geometry

↳ Exercise – 10A

Do yourself

↳ Exercise – 10B

Q1. Do yourself

Q2. $\angle R = 90^\circ$

Q3. Do yourself

Q4. Do yourself

Q5. 40°

Q6. Do yourself

Q7. No



Chapter

11

Perimeter and Area

Exercise – 11A

Q1. $\left(\begin{array}{l} \text{Area to} \\ \text{be painted} \end{array} \right) = \left(\begin{array}{l} \text{Area of} \\ \text{square wall} \end{array} \right) - \left(\begin{array}{l} \text{Area of rectangular} \\ \text{door frame} \end{array} \right)$

$$\text{Side of a wall} = a = 10 \text{ m}$$

$$\text{Area of wall} = a \times a$$

$$= 10 \times 10$$

$$= 100 \text{ m}^2$$

$$\text{length} = l = 3 \text{ m}$$

$$\text{Breadth} = b = 2 \text{ m}$$

$$\text{Area of door frame} = l \times b$$

$$= 3 \times 2$$

$$= 6 \text{ m}^2$$

$$\therefore \text{Area to be painted} = 100 - 6 = 94 \text{ m}^2$$

$$\text{Labour charge for painting } 1 \text{ m}^2 \text{ of wall} = ₹ 2.50$$

$$\text{Labour charge for painting } 94 \text{ m}^2 \text{ of wall} = ₹ 2.50 \times 94$$

$$= ₹ \frac{25}{10} \times 94$$

$$= ₹ 235$$

$$\therefore \text{Labour will charge ₹ 235.}$$

Q2. Length of rectangle = $l = 25 \text{ m}$

$$\text{Breadth of rectangle} = b = ?$$

$$\text{Area of sheet} = 500 \text{ cm}^2$$

$$l \times b = 500$$

$$25 \times b = 500$$

$$b = \frac{500}{25}$$

$$b = \frac{100}{5}$$

$$b = 20 \text{ cm}$$

\therefore Width of the sheet is 20 cm.

$$\begin{aligned} \text{Perimeter of sheet} &= 2(l + b) \\ &= 2(25 + 20) \\ &= 2(45) \\ &= 90 \text{ cm} \end{aligned}$$

\therefore Perimeter of a given sheet is 90 cm.

Q3. Length of fence required = Sum of given three sides

$$\begin{aligned} &= 12 + 20 + 12 \\ &= 44 \text{ m} \end{aligned}$$

$$\text{Cost of fencing 1 m} = ₹ 150$$

$$\begin{aligned} \text{Cost of fencing 44 m} &= ₹ 150 \times 44 \\ &= ₹ 6,600 \end{aligned}$$

\therefore ₹ 6,600 will be needed to fence given garden.

Q4. We know in this case

$$\text{Perimeter of square} = \text{Perimeter of rectangle}$$

$$\text{Side of square} = a = 10 \text{ cm}$$

$$\text{Perimeter} = 4a$$

$$= 4 \times 10 = 40 \text{ cm}$$

$$\text{Length of rectangle} = l = 12 \text{ m}$$

$$\text{Breadth of rectangle} = b = ?$$

$$\text{Perimeter} = 2(l + b)$$

$$= 2(12 + b)$$

∴ Perimeter of square = Perimeter of rectangle

$$40 = 2(12 + b)$$

$$\frac{40}{2} = 12 + b$$

$$20 - 12 = b$$

$$8 = b$$

∴ Breadth of rectangle is 8 cm.

Now, Area of square = $a \times a = 10 \times 10 = 100 \text{ cm}^2$

$$\text{Area of rectangle} = l \times b = 12 \times 8 = 96 \text{ cm}^2$$

Area of square is greater than area of rectangle.

Q5. Area of square = Area of rectangle (Given)

Side of square = $a = 40 \text{ cm}$

Area of square = $a \times a = 40 \times 40$

$$= 1600 \text{ cm}^2$$

Breadth of rectangle = 25 cm

Length of rectangle = l

Area of rectangle = $l \times b$

$$= l \times 25$$

$$= 25l \text{ cm}^2$$

Area of square = Area of rectangle

$$1600 = 25l$$

$$\frac{1600}{25} = l$$

$$64 \text{ cm} = l$$

Perimeter of the rectangle = $2(l + b)$

$$= 2(64 + 25)$$

$$= 2(89)$$

$$= 178 \text{ cm}$$

Q6. Circumference = πd

$$220 = \frac{22}{7} \times d$$

$$\frac{220}{22} \times 7 = d$$

$$d = 70 \text{ cm}$$

Q7. Perimeter of square = $4 \times 11 = 44$

Circumference of circle = πd

$$44 = \frac{22}{7} \times d$$

$$\frac{44 \times 7}{22} = d$$

$$d = 14 \text{ cm}$$

Q8. $l = 8.9 \text{ cm}$ or 89 mm ; $b = 54$

$$\text{Perimeter} = 2(l + b)$$

$$= 2(89 + 54)$$

$$= 2(143)$$

$$= 286 \text{ mm}$$

$$\text{Circumference} = \frac{22}{7} \times 2 \times r$$

$$\frac{286 \times 7}{22 \times 2} = r$$

$$r = 45.5 \text{ mm}$$

Q9. Let radii be $9x$ and $16x$.

$$\frac{\text{Circumference of 1}}{\text{Circumference of 2}} = \frac{2\pi 9x}{2\pi 16x} = \frac{9}{16} \quad \text{or } 9:16$$

Q10. Circumference of outer = $2\pi R$

$$132 = 2 \times \frac{22}{7} \times R$$

$$\frac{132 \times 7}{2 \times 22} = R$$

$$R = 21$$

Circumference of inner = $2\pi r$

$$88 = 2 \times \frac{22}{7} \times r$$

$$\frac{38 \times 7}{2 \times 22} = r$$

$$r = 14$$

difference = $21 - 14 = 7$ cm

► Exercise – 11B

Q1. Area of parallelogram = $b \times h$
 $= 4 \times 3$
 $= 12 \text{ cm}^2$

Q2. Area of parallelogram = $b \times h$
 $24 \text{ cm}^2 = 4 \times x$
 $\frac{24}{4} = x$

$$6 \text{ cm} = x$$

∴ Height of parallelogram is 6 cm.

Q3. (a) Here, Base = $CD = 6$ cm

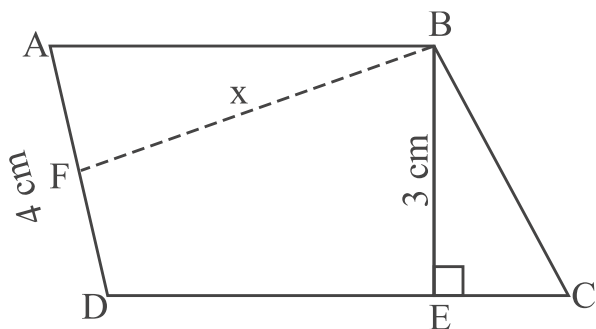
$$\text{Height} = BE = 3 \text{ cm}$$

$$\begin{aligned} \text{Area of parallelogram} &= b \times h \\ &= 6 \text{ cm} \times 3 \text{ cm} \\ &= 18 \text{ cm}^2 \end{aligned}$$

(b) Let the height be BF

$$\text{Base} = AD = 4 \text{ cm}$$

$$\text{Height} = BF = x \text{ cm}$$



Area of parallelogram = $b \times h$

$$18 = AD \times BF$$

$$18 = 4 \times BF$$

$$BF = \frac{18}{4}$$

$$BF = \frac{9}{2}$$

$$BF = 4.5 \text{ cm}$$

\therefore height is 4.5 cm

Q4. (a) Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

$$= \frac{1}{2} \times 4 \times 2$$

$$= 4 \text{ cm}^2$$

(b) Area of triangle = $\frac{1}{2} \times b \times h$

$$= \frac{1}{2} \times 3 \times 2$$

$$= 3 \text{ cm}^2$$

Q5. Area of triangle = $\frac{1}{2} \times b \times h$

$$36 \text{ cm}^2 = \frac{1}{2} \times b \times 3 \text{ cm}$$

$$72 = b \times 3$$

$$\frac{72}{3} = b$$

$$b = 24 \text{ cm}$$

$$BC = \text{base} = 24 \text{ cm}$$

Q6. (a) Base = $QR = 4 \text{ cm}$

$$\text{Height} = PL = 5 \text{ cm}$$

$$\text{Area of } \triangle ABC = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times 4 \times 5$$

$$= 2 \times 5 = 10 \text{ cm}^2$$

(b) Base = $PR = 8 \text{ cm}$

$$\text{Height} = QM = ?$$

$$\text{Area of } \triangle PQR = \frac{1}{2} \times b \times h$$

$$10 = \frac{1}{2} \times PR \times QM$$

$$10 = \frac{1}{2} \times 8 \times QM$$

$$10 = 4 \times QM$$

$$\frac{10}{4} = QM$$

$$\frac{5}{2} = QM$$

$$QM = 2.5 \text{ cm}$$

Q7. Area = 28 m; Perimeter = 28 m

$$\text{Side of the rhombus} = \frac{\text{Perimeter}}{4} = \frac{28}{4} = 7 \text{ m}$$

$$\text{Altitude} = \frac{\text{Area}}{\text{Base}} = \frac{28}{7} = 4 \text{ m}$$

Q8. $\text{Altitude} = \frac{\text{Area}}{\text{Base}} = \frac{2.25}{2.50} \times \frac{100}{10}$
 $= 90 \text{ cm or } 0.90 \text{ m}$

Q9. $r = 50 \text{ m}; R = 71 \text{ m}$

$$\begin{aligned} \text{Area} &= A_1 - A_2 \\ &= \pi(R^2 - r^2) = \pi[(71)^2 - (50)^2] \\ &= \pi(5041 - 2500) \end{aligned}$$

$$\frac{22}{7} \times 2541 = 7986 \text{ m}^2$$

$$\text{Area} = 7986 \text{ m}^2$$

Soil preparation cost = ₹ 2 per m^2

So, Total cost = $7986 \times 2 = ₹ 15972$

Q10. 17, 15, 8 cm

$$(17)^2 = (15)^2 + (8)^2$$

$$289 = 225 + 64$$

$$289 = 289$$

$$\text{right angled } \Delta s = \frac{1}{2} \times 15 \times 8$$

$$\text{Area} = 60 \text{ cm}^2$$

➔ Multiple Choice Questions

Q1. (d) $\text{Area} = \frac{1}{2} \times b \times h$

$$21 = \frac{1}{2} \times 6 \times h = 3h$$

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

$$h = 7 \text{ cm}$$

Q2. (c) $s = \frac{s}{2}$

$$\text{Area} = (s)^2 \quad \frac{1}{4} \text{ of the original area}$$

$$= \left(\frac{s}{2}\right)^2 \text{ or } \frac{s^2}{4}$$

Q3. (d) $\frac{\text{Circumference of 1}}{\text{Circumference of 2}} = 2\pi \frac{r}{r} = \frac{5}{7} = 5 : 7$

Q4. (b) $l = 3l, b = b$

$$\text{Area} = l \times b = 3l \times b \quad \text{Three times the original area}$$



Chapter

12

Algebraic Expressions

Exercise – 12A

- Q1.** (a) $a^2 - b^2 =$ binomial
(b) $xy + yz + zx =$ trinomial
(c) $67x =$ monomial
(d) $2x - z + 4 =$ trinomial
(e) $ax^3 + bx^2 + x + d =$ quadrinomial
(f) $p^2q + qr + r^3q =$ trinomial
- Q2.** (a) $2x + 3y - 5$
 $2x, 3y, -5$
(b) $3x^5 + 5y^4 - 7x^2y$
 $3x^5, 5y^4, -7x^2y$
(c) $ab - a - b$
 $ab, -a, -b$
(d) $-4x + 5y$
 $-4x, 5y$
- Q3.** (a) $ab - (a + b)$
(b) $10 - yz$
(c) $x^2 + y^2$
(d) $\frac{1}{2}(x + y)$
(e) z^2

Q4. (a) $-2pq = -2q$

(b) $pqr = qr$

(c) $8pr^2 = 8r^2$

(d) $-9pqr^2 = -9qr^2$

Q5. (a) $-x^2 + 3 - y^2 = -1, 3, -1$

(b) $x^3 - 7x^2y + 5xy^2 - 2 = 1, -7, 5, -2$

Q6. (a) $x^2y^2, +2xy$; unlike terms $x^2, y^2, +2xy$

(b) $8x^4y, -7x^3y^2; +\frac{4}{3}x^2, yz^2 =$ unlike terms

(c) $3y, -2y, +7y; -2y =$ like terms

(d) $4xy, 2x^2y, -3xy^2 =$ unlike terms

(e) $ab^2x, a^4b^2c, abc =$ unlike terms

(f) $5abc^2, -4abc^2, 8abc^2 =$ like terms

Q7. (a) $abc + a^2bc + ab^2c^3 + abc^2 = 6$

(b) $2x^2y - 3xy + 4x = 3$

(c) $3y^2 - 2y^5 + 6y^4 + 21y + 7 = 5$

(d) $\frac{1}{2}x^3 - \frac{3}{7}x^2y^2 + \frac{5}{9}xy + z = 4$

➔ Exercise – 12B

Q1. (a) $4xy + 2xy + 5xy = 11xy$

(b) $2x + 3y + z + 2x - y - z = 4x + 2y$

(c) $6x^2 - 7x + 1 - 3x^2 + 4x + 2 + x^2 - x - 3 = 4x^2 - 4x$

(d) $-7mn + 12mn + 9mn - 2mn + 5 + 2 - 8 - 3 = 12mn - 4$

(e) $5a^2 + 7a + 3 + 12a^2 - 3a + 8 + 16a^2 - 4a + 7$
 $= 33a^2 + 18$

Q2. (a) $a^3 + 2a^2b + 6ab^2 - b^3$ from $b^3 - 3ab^2 - 4a^2b$
 $b^3 - 3ab^2 - 4a^2b - a^3 - 2a^2b - 6ab^2 + b^3$
 $2b^3 - 9ab^2 - 6a^2b^2 - a^3$

(b) $-7x^2 + 7x + 2 - 6x^2 + 3x - 4$
 $-13x^2, +10x - 2$

(c) $5p^2 + 3q^2 - 9q - 4pq + 5q^2 + 3p^2$
 $8p^2 + 8q^2 - 9q - 4pq$

(d) $(a + b - a + b)$
 $2b$

Q3. Total length of two ropes = $4x + 3 + 6x - 7$
 $= (10x - 4)$ metres

Q4. Perimeter = $4 \times \text{side}$
 $= 4 \times (5x + 4)$
 $= 20x + 16$

Q5. $6x^2 + 5x + 8$
 $2x^2 - 4x + 3$ were girls
 boys = $6x^2 + 5x + 8 - 2x^2 + 4x - 3$
 $= 4x^2 + 9x + 5$

Q6. Let the subtrahend number be x .
 $2m + 8n + 10 + 3m - 7n - 16 = x$
 $5m + n - 6 = x$
 So, $2m + 8n + 10 - x = -3m + 7n + 16$

Q7. $3x + 2y + 3z + 3x - 4y + 5z$
 $= 6x - 2y + 8z - (6x + 7y - 2z)$
 $= 6x - 2y + 8z - 6x - 7y + 2z$
 $= -9y + 10z$

Q8. $3a - 5b + 3c + 2a + 4b - 5c$

$$\begin{aligned}
 &= 5a - b - 2c - (4a - b - c + 3) \\
 &= 5a - b - 2c - 4a + b + c - 3 \\
 &= a - c - 3
 \end{aligned}$$

➔ **Exercise – 12C**

Q1. (a) $3a - 5$

$$3(2) - 5 = 1$$

(b) $9 - 5a$

$$9 - 5(2) = -1$$

(c) $3a^2 - 2a - 7$

$$= 3(2)^2 - 2(2) - 7$$

$$= 3(4) - 4 - 7$$

$$= 12 - 4 - 7$$

$$= 1$$

Q2. (a) $2x^2 - x - 2$

$$= 2(-1)^2 - (-1) - 2$$

$$= +2 + 1 - 2$$

$$= 1$$

(b) $-x + 2$

$$= -(-1) + 2$$

$$= 3$$

(c) $x^2 + 2x + 1$

$$= (-1)^2 + 2(-1) + 1$$

$$= 1 + (-2) + 1$$

$$= 0$$

Q3. (a) $a^2 + b^2$

$$= (2)^2 + (-2)^2$$

$$= 4 + 4 = 8$$

$$\begin{aligned} \text{(b)} \quad a^2 + ab + b^2 &= (2)^2 + (2)(-2) + (-2)^2 \\ &= 4 + (-4) + 4 \\ &= 4 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad a^2 - b^2 &= (2)^2 - (-2)^2 \\ &= 4 - 4 \\ &= 0 \end{aligned}$$

$$\begin{aligned} \text{Q4. (a)} \quad 3(x+2) + 5x - 7 &= 3x + 6 + 5x - 7 \\ &= 8x - 1 \\ &= 8(2) - 1 = 15 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad 6x + 5(x-2) &= 6x + 5x - 10 \\ &= 11x - 10 \\ &= 11(2) - 10 \\ &= 12 \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad 4(2x-1) + 3x + 11 &= 8x - 4 + 3x + 11 \\ &= 11x + 7 \\ &= 11(2) + 7 \\ &= 29 \end{aligned}$$

$$\begin{aligned} \text{Q5. (a)} \quad 2 - 8x + 4x + 4 &= -4x + 6 \\ &= -4(3) + 6 \\ &= -12 + 6 \\ &= -6 \end{aligned}$$

$$\text{(b)} \quad 10 - 3b - 4 - 5b$$

$$\begin{aligned}
 &= 6 - 8b \\
 &= 6 - 8(-2) \\
 &= 6 + 16 \\
 &= 22
 \end{aligned}$$

$$\begin{aligned}
 \text{(c)} \quad &2a - 2b - 4 - 5 + a \\
 &= 3a - 2b - 9 \\
 &= 3(-1) - 2(-2) - 9 \\
 &= -3 + 4 - 9 \\
 &= 1 - 9 \\
 &= -8
 \end{aligned}$$

$$\begin{aligned}
 \text{(d)} \quad &2(a^2 + ab) + 3 - ab \\
 &= 2a^2 + 2ab + 3 - ab \\
 &= 2a^2 + ab + 3 \\
 &= 2(5)^2 + 5 \times (-3) + 3 \\
 &= 2 \times 25 + (-15) + 3 \\
 &= 50 - 15 + 3 \\
 &= 38
 \end{aligned}$$

➔ Multiple Choice Questions

- Q1.** (c) trinomial expression
Q2. (c) Constant term
Q3. (b) 12 as $3 \times 2 + 2 \times 3 = 12$
Q4. (b) $0 - (5a + 4b - 3)$ i.e., $-5a - 4b + 3$
Q5. (a) 3

$$4x - 4 = 5 + x$$

$$4x - x = 5 + 4$$

$$3x = 9 = x = 3$$



Chapter

13

Exponents and Powers

Exercise – 13A

$$\text{Q1. (a) } \left(\frac{2}{5}\right)^3 = \frac{2}{5} \times \frac{2}{5} \times \frac{2}{5}$$

$$= \frac{8}{125}$$

$$\text{(b) } \left(\frac{6}{-9}\right)^3 = \frac{6}{-9} \times \frac{6}{-9} \times \frac{6}{-9}$$

$$= \frac{-216}{729}$$

$$\text{(c) } \left(\frac{-3}{7}\right)^2 = \frac{-3}{7} \times \frac{-3}{7}$$

$$= \frac{9}{49}$$

$$\text{(d) } \left(\frac{8}{11}\right)^4 = \frac{8}{11} \times \frac{8}{11} \times \frac{8}{11} \times \frac{8}{11} = \frac{4096}{14641}$$

$$\text{Q2. (a) } \left(\frac{36}{81}\right) = \frac{6 \times 6}{9 \times 9} = \left(\frac{6}{9}\right)^2$$

$$\text{(b) } \frac{5}{7} \times \frac{5}{7} \times \frac{5}{7} \times \frac{5}{7} = \left(\frac{5}{7}\right)^4$$

$$\text{(c) } \frac{2}{-3} \times \frac{2}{-3} \times \frac{2}{-3} \times \frac{2}{-3} \times \frac{2}{-3} = \left(\frac{-2}{3}\right)^5$$

Q3. (a) 15^6 ; Base = 15, exponent = 6

(b) $\left(\frac{-1}{|2|}\right)^3$; Base = $\frac{-1}{2}$, exponent = 3

(c) 12^{-7} ; Base = 12, exponent = -7

(d) 8^{x+y} Base = 8, exponent = $x + y$

Q4. (a) $3600 = 2^4 \times 3^2 \times 5^2$

2	3600
2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

(b) $540 = 2^2 \times 3^3 \times 5$

2	540
2	270
3	135
3	45
3	15
5	5
	1

(c) $405 = 3^4 \times 5$

3	405
3	135
3	45
3	15
5	5
	1

(d) $648 = 2^3 \times 3^4$

2	648
2	324
2	162
3	81
3	27
3	9
3	3
	1

Q5. (a) $2^{10} = 1024$ and $10^2 = 100$

$$2^{10} > 10^2$$

(b) $2^8 = 256$ and $8^2 = 64$

$$2^8 > 8^2$$

(c) $5^3 = 125$ and $3^5 = 243$

$$5^3 < 3^5$$

(d) $4^3 = 64$ and $3^4 = 81$

$$4^3 < 3^4$$

Q6. (a) $\frac{-1}{125} \Rightarrow \left(\frac{-1}{5}\right)^3$

(b) $\frac{16}{100} \Rightarrow \frac{4 \times 4}{10 \times 10} \Rightarrow \left(\frac{4}{10}\right)^2$ or $\left(\frac{2}{5}\right)^2$

(c) $\frac{144}{256} \Rightarrow \frac{12 \times 12}{16 \times 16} \Rightarrow \left(\frac{12}{16}\right)^2$ or $\left(\frac{3}{4}\right)^2$

(d) $\left(\frac{-8}{27}\right) \Rightarrow \frac{-2 \times -2 \times -2}{3 \times 3 \times 3} \Rightarrow \left(\frac{-2}{3}\right)^3$

Q7. (a) $(-3)^4 \Rightarrow -3 \times -3 \times -3 \times -3 \Rightarrow \left(\frac{-1}{3}\right)^4$

(b) $(-4)^3 \Rightarrow -4 \times -4 \times -4 \Rightarrow \left(\frac{-1}{4}\right)^3$

(c) $\left(\frac{-5}{9}\right)^2 \Rightarrow \text{reciprocal} \left(\frac{-9}{5}\right)^2$

(d) $\left(\frac{-7}{11}\right)^5 \Rightarrow \text{reciprocal} \left(\frac{-11}{7}\right)^8$

Q8. 1, -1, 1000, 625

► **Exercise – 13C**

Q1. (a) $\left(\frac{2}{5}\right)^{-4} \div \left(\frac{4}{5}\right)^{-5}$

$$\left(\frac{5}{2}\right)^4 \div \left(\frac{5}{4}\right)^5$$

$$\frac{5 \times 5 \times 5 \times 5}{2 \times 2 \times 2 \times 2} \times \frac{4 \times 4 \times 4 \times 4 \times 4}{5 \times 5 \times 5 \times 5 \times 5}$$

$$\Rightarrow \frac{64}{5}$$

$$\begin{aligned} \text{(b)} \quad & \frac{25 \times 5 \times 5 \times t^8}{10 \times 10 \times 10 \times t^4} \\ & = \frac{5t^4}{8} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad & \left[\frac{3}{7}\right]^{-1} \times \left[\frac{3}{7}\right]^{-2} \times \left[\frac{3}{7}\right]^7 \\ & \left[\frac{3}{7}\right]^{-1+(-2)+4} \\ & \left[\frac{3}{7}\right]^1 = \frac{3}{7} \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad & \frac{3 \times 3 \times 3 \times 3 \times 3 \times 10 \times 10 \times 10 \times 10 \times 10 \times 5^2}{5^7 \times 6 \times 6 \times 6 \times 6 \times 6} \\ & = 1 \end{aligned}$$

Q2. (a) 3.8

$$3.8 \times 10^0$$

(b) 6700

$$6.7 \times 10^3$$

(c) 54300

$$5.43 \times 10^4$$

(d) 92 lakh = 9200000

$$9.2 \times 10^6$$

(e) 0.000008

$$8 \times 10^{-6}$$

(f) 0.000027

$$2.7 \times 10^{-5}$$

(g) 5.34

$$5.34 \times 10^0$$

- Q3.** (a) $3.5 \times 10^2 = 350$
 (b) $5.81 \times 10^{-4} = 0.000581$
 (c) $2.9275 = 2.9275$
 (d) $0.024 \times 10^3 = 24$
 (e) $6.007 \times 10^{-7} = 0.0000006007$
 (f) $1.0009 \times 10^8 = 100090000$
- Q4.** Sound travels 3.3×10^4 cm/sec
 or 33000 cm/sec
- Q5.** (a) 3×10^8 m/s
 (b) 3.84×10^8 m
 (c) 1.4×10^9 m
 (d) 1.353×10^9 km³
 (e) 1×10^{11}

➔ Multiple Choice Questions

- Q1.** (b) $25 \div 25 = 1$
- Q2.** (c) $\left(\frac{1}{2}\right)^3 \times 4$ is $\frac{1 \times 4}{8} = \frac{1}{2}$ reciprocal $\Rightarrow \frac{2}{1}$
- Q3.** (c) $\left[\left(\frac{3}{5}\right)^0\right]^4 \Rightarrow (1)^4 \Rightarrow 1$
- Q4.** (c) $5^{(x-1)} = (5)^4$
 $x - 1 = 4 \Rightarrow x = 5$
- Q5.** (b) $4^{4x+4} = 1$
 as $(4)^0 = 1$; so $4^{4x+4} = 4^0$
 $4x + 4 = 0$
 $x = -1$

Q6. (a) $\left[\left(\frac{2}{5}\right)^2\right]^5 = \left(\frac{2}{5}\right)^{5x}$

$$\left(\frac{2}{5}\right)^{10} = \left(\frac{2}{5}\right)^{5x}$$

$$10 = 5x$$

$$2 = x;$$

Q7. (a) $0.00003 \times 10^6 = 30$
greater than 1

Q8. (b) 6.4×10^4
6400



Chapter

14

Symmetry

Exercise – 14A

Q1. Do yourself

Q2. Do yourself

Q3. (a) true

(b) true

(c) false

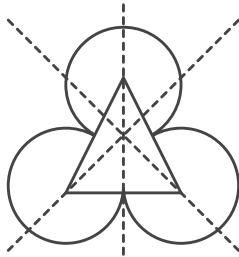
(d) true

Q4. (a) Vertical mirror → A, H, I, M, O, T, U, V, W, X and Y

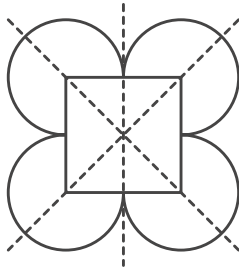
(b) Horizontal mirror → B, C, D, E, H, I, O and X

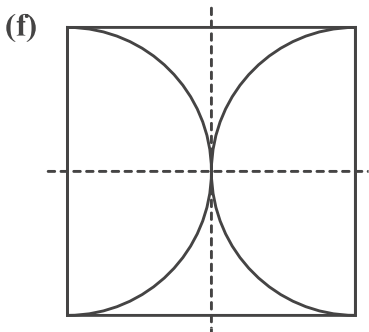
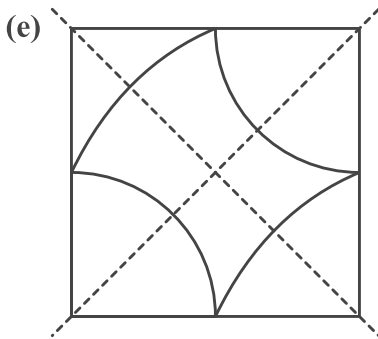
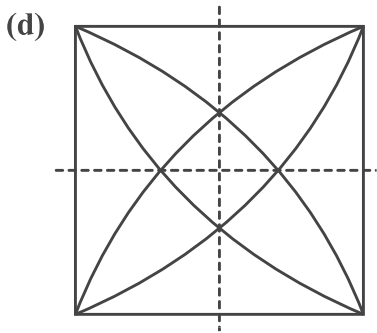
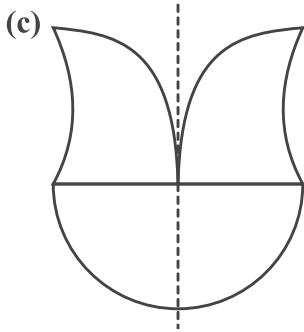
(c) Both horizontal and vertical mirror → H, I, O and X

Q5. (a)



(b)





➔ Exercise – 14B

Q1. Do yourself

Q2. (a) 4

(b) 5

(c) 6

(d) 2

Q3. 5

Q4. Parallelogram

Q5. Equilateral triangle, Square

Q6. Square

Q7.

	Shape	Centre of Rotation	Order of Rotation	Angle of Rotation
(a)	Square	Intersecting point of diagonals	4	90°
(b)	Rectangle	Intersecting point of diagonals	2	180°
(c)	Circle	Centre	infinite	At every point
(d)	Hexagon	Intersecting point of diagonals	6	60°
(e)	Rhombus	Intersecting point of diagonals	2	180°
(f)	Semi-Circle	Mid point of diameter	1	360°

➔ Multiple Choice Questions

Q1. (b)

Q2. (a)

Q3. (b)

Q4. (d)

Q5. (c)

Q6. (a)

Q7. (a)



Chapter

15

Visualising Solid Shapes

➔ Exercise – 15A

- Q1. (a) True
(b) False
(c) True
(d) True

Q2.

	Shape	No. of faces	No. of edge	No. of vertex
(a)	Cuboid	6	12	8
(b)	Cube	6	12	8
(c)	Sphere	1	0	0
(d)	Cone	2	1	1
(e)	Cylinder	3	2	0

- Q3. (a) $V = 4, e = 4$
(b) $V = 0, e = 0$
(c) $V = 7, e = 7$
(d) $V = 0, e = 2$
(e) $V = 1, e = 1$

➔ Exercise – 15B

Do yourself

➔ **Exercise – 15C**

- Q1. Do yourself
Q2. (b)
Q3. Do yourself
Q4. (a) book, brick, bus, box
(b) pipe, pen, jar, wire

➔ **Exercise – 15D**

- Q1. (a) 10
(b) 10
Q2. 10
Q3. 49
Q4. (a) (ii)
(b) (iii)
(c) (iv)
(d) (i)
Q5. Do yourself
Q6. (a) True
(b) False
Q7. Do yourself

➔ **Multiple Choice Questions**

- Q1. (b)
Q2. (b)
Q3. (c)
Q4. (d)
Q5. (c)
Q6. (a)
Q7. (b)
Q8. (b)

