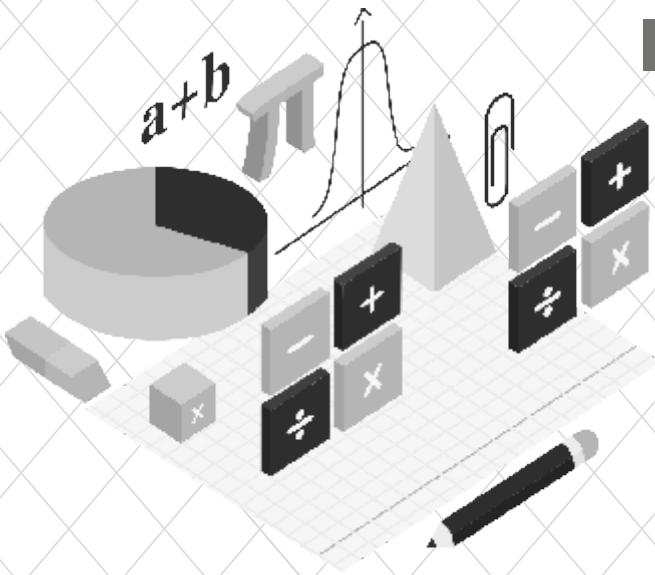


# Maths Link

Teacher Manual

Class 7





$$\begin{aligned}
 7. \text{ Total Score} &= 30 + (-10) + (-12) + (-5) + (-15) + 20 \\
 &= 30 - 10 - 12 - 5 - 15 + 20 \\
 &= 20 - 12 - 5 - 15 + 20 = 8 - 5 - 15 + 20 = 3 + 5 = 8
 \end{aligned}$$

$$8. \text{ Temperature outside} = 25^\circ \text{C}$$

$$\text{Temperature in cold room} = 25 - 37 = -12^\circ \text{C}$$

$$\begin{array}{ll}
 \text{A} & 1. \quad 1792 \times 997 - 792 \times 997 & 997 \times (1792 - 792) \\
 & 997 \times 1000 & 997000
 \end{array}$$

$$2. \quad 7 + [5 + (-3)] = 7 + 2 = 9$$

$$\begin{array}{ll}
 3. \quad 295 \times (-66) + (-295) \times (-34) & -295[-66 + (-34)] \\
 -295 \times (-100) & 29500
 \end{array}$$

$$\begin{array}{ll}
 4. \quad 65129 \times 99 - (-65129) & 65129 \times 99 - (-65129 \times 1) \\
 56129 [99 - (-1)] & 65129 \times 100 \\
 6512900 &
 \end{array}$$

$$5. \quad -70 \times (10 - 8 - 39 + 107), -70 \times (+70)$$

$$-4900$$

$$\begin{array}{ll}
 6. \quad (-142) + (-58) + 200 & = -142 - 58 + 200 \\
 -200 + 200 = 0 &
 \end{array}$$

$$\begin{array}{llll}
 \text{B} & 1. \quad 5 & 2. \quad 2, 4 & 3. \quad 10 & 4. \quad 12 \\
 & 5. \quad -57, 26 & 6. \quad 39 & &
 \end{array}$$

$$\begin{array}{ll}
 \text{C} & 1. \quad 56 \div (-9 - 5) = 56 \div (-14) = -4 & 2. \quad 500 \div (-5) = -100 \\
 & 3. \quad [-48 \div 12] \div 4 - 4 \div 4 = -1 & 4. \quad (-490) \div (-5) \\
 & & 98
 \end{array}$$

$$5. \quad 12 \div (-2) \div 1 - 12 \div -2$$

$$6$$

$$6. \quad 0 \div (100) = 0$$

$$7. \quad (-36) \div (-9), 4$$

$$\begin{array}{ll}
 8. \quad -51 \div [(-4) - (-1)] & -51 \div [-4 + 1] \\
 -51 \div -3 = 17 &
 \end{array}$$

$$9. \quad -208 \div 8 \qquad -26$$

$$\begin{array}{llll}
 \text{D} & 1. \quad 0 & 2. \quad -5 & 3. \quad 1 & 4. \quad -1 \\
 & 5. \quad -1 & 6. \quad -11 & 7. \quad 125 & 8. \quad -83
 \end{array}$$

**E** Let the other number be  $x$

$$\therefore \text{ According to question } x \times 9 = -153$$

$$x = \frac{-153}{9} = -17$$

- F** Speed of the doctor = 6 m/min  
 Distance =  $10 - (-350) = 10 + 350 = 360$   
 Time =  $\frac{360}{6} = 60 \text{ min} = 1 \text{ hour}$
- G** Temperature at 4pm =  $41^\circ\text{C}$   
 Temperature after 6 hours (10pm) =  $29^\circ\text{C}$   
 Fall in temperature =  $41^\circ\text{C} - 29^\circ\text{C} = 12^\circ\text{C} = 12^\circ\text{C}$

- A**
- $-16 + (-46) = -16 - 46 = -62$
  - $-68 + (-14) = -68 - 14 = -82$
  - $17 - 7 + (-5) = 10 - 5 = 5$
  - $26 - 16 - (-6) = 10 + 6 = 16$
  - $-7 - (-7) = -7 + 7 = 0$
  - $-13 - (-17) = -13 + 17 = 4$
  - $-46 - (-34) - (-22) = -46 + 34 + 22 = -12 + 22 = 10$
  - $52 + (-20) - (-24) + 28 = 52 - 20 + 24 + 28 = 32 + 24 + 28 = 84$
  - $64 - (-36) - 42 + (-6) + 20 - (-8)$   
 $= 64 + 36 - 42 - 6 + 20 + 8 = 100 - 48 + 28 = 52 + 28 = 80$
  - $-83 - (-28) + 54 - (-22) - 24 - (-20)$   
 $-83 + 28 + 54 + 22 - 24 + 20 = -83 + 82 - 2 + 20$   
 $-83 + 80 + 20 = -3 + 20$   
 $17$

- B**
- $(-6) \times 8 \times (-7) \times (-5) \times (-3) = 5040$
  - $(-13) \times 7 \times (-5) \times 4 \times (-4) = -7280$
  - $-9 \times (-18) = 162$
  - $6 \times 28 = 168$

- C**
- $-1683 \div 33 = -51$
  - $-9028 \div (-4) = 2257$
  - $5050 \div (-25) = -202$
  - $(-1248) \div (-52) = 24$
  - $-48 \div 6 = -8$
  - $88 \div -8 = -11$
  - $(-144) \div (-12) = 12$
  - $2025 \div -25 = -81$

- D**
- $24 \div 3 - 15 \div 3 \times 2 = 8 - 5 \times 2 = 8 - 10 = -2$
  - $625 \div 5 \times 4 + 8 - 6 \times (-8) = -125 \times 4 + 8 + 48 = 500 + 8 + 48 = 556$
  - $8 \times 7 + 28 \div 7 = 8 \times 7 + 4 = 56 + 4 = 60$
  - $5 \times 3 - 12 \div 4 + 8 = 5 \times 3 - 3 + 8 = 15 - 3 + 8 = 15 + 5 = 20$

- E**
- $64 + \{124 - 12 \times (3 \times 7)\} \div 4$   
 $64 + [124 - 12 \times 10] \div 4 = 64 + [124 - 120] \div 4 = 64 + 4 \div 4 = 65$
  - $96 - [24 - 10 \div \{4 + (3 \times 3) \div 9\}]$   
 $96 - [24] - 10 \div (4 + 9 \div 9)$   
 $96 - [24 - 10 \div (4 + 1)]$   
 $96 - [24 - 10 \div 5] = 96 - [24 - 2] = 96 - 22 = 74$
  - $4 \times 5 - [7 - \{10 + 20 \div (5 - 6 + 2)\}] = 4 \times 5 - [7 - (10 + 20 \div 1)]$   
 $= 4 \times 5 - \{7 - 30\} = 4 \times 5 - \{-23\} = 20 + 23 = 43$
  - $24 - \{5 - 24 \div 6 + (8 - 5)\} = 24 - \{5 - 24 \div 6 + 3\}$   
 $= 24 - \{5 - 4 + 3\} = 24 - 4 = 20$

- F**
- $[29 - (-2)\{6 - (7 - 3)\}] \div [3 \times \{5 + (-3) \times (-2)\}]$   
 $= [29 + 2(6 - 4)] \div [3 \times \{5 + 6\}] = 29 + 2 \times 2 \div 3 \times 11$   
 $= 33 \div 33 = 1$
  - $6 \times 5 - [-10 - \{26 + 32 \div (-4 - 42 - 14)\}] - 7$   
 $6 \times 5 - [-10 - \{26 + 32 \div (-4 - 28)\}] - 7$   
 $6 \times 5 - [-10 - \{26 + 32 \div -32\}] - 7$   
 $6 \times 5 - [-10 - \{26 - 1\}] - 7$   
 $6 \times 5 - [10 - 25] - 7$   
 $30 - [-15] - 7 \quad 30 + 15 - 7 \Rightarrow 45 - 7 \Rightarrow 38$
  - $14 - [15 - 10 - (-6) \div 2 - \{(-14) + 28 - 46 - 32\}]$   
 $14 - [15 - 10 + 6 \div 2 - \{-14 + 28 - 14\}]$   
 $14 - (15 - 10 + 6 \div 2 - 0)$   
 $14 - (15 - 10 + 3)$   
 $14 - 8 = 6$

**A** 1. (a)      2. (d)      3. (c)      4. (b)      5. (d)      6. (d)

**B**  $-35, -25, -12, -9, 0, 7, 9, 18$

**C**  $26, 15, 6, 0, -10, -32, -42, -48$

**D** 1.  $-37 - (-15) - 2 = -37 + 15 - 2 = -22 - 2, -24$

2.  $16 - [14 - (-2) - (-6)], 16 - [14 + 2 + 6], 16 - 22, -6$

3.  $734 + 69 + 131 - 234, 934 - 234$   
 $700$

4.  $937 + (-37) + 100 - (-200) + 300$   
 $937 - 37 + 100 + 200 + 300$   
 $900 + 100 + 200 + 300$   
 $1500$

- E**
- $-8 \times 125 \times 3 \times 4$                        $[125 \times (-8)] \times 3 \times 4$   
 $-1000 \times 3 \times 4$                        $-12000$
  - $4 \times 169 \times 250$                        $(250 \times 4) \times 169$   
 $1000 \times 169$                        $169000$
  - $(-50) \times 18 \times 4 \times (-2)$                        $[-50 \times (-2)] \times (18 \times 4)$   
 $100 \times 72 = 7200$
  - $80 \times 16 \times (-5) \times 2$                        $[80 \times (-5)] \times (16 \times 2)$   
 $(-400) \times 32, -12800$
  - $758 + 200 + 142 + (-100),$                        $758 + 142 + 200 - 100$   
 $900 + 100 = 1000$
  - $(-15) + 24 + 5 + (-4), -15 + 29 - 4, -15 + 25, 10$
  - $42 + 11 + 58 + 19, (42 + 58) + (11 + 19)$   
 $100 + 30$                        $= 130$
  - $25 \times 7 \times 4 \times 8, (25 \times 8) \times (7 \times 4), 200 \times 28, 5600$

- F**
- $115 \times (-98)$                        $115 \times (-100 + 2)$   
 $115 \times (-100) + 115 \times 2$                        $-11500 + 230$   
 $11270$
  - $-48 \times 105$                        $-48 \times (100 + 5)$   
 $(-48 \times 100) + (-48 \times 5)$                        $-4800 + (-240)$   
 $-4800 - 240$                        $-5040$
  - $325 \times (-204)$                        $325 \times (-200 - 4)$   
 $325 \times (-200) + 325 \times (-4),$                        $-6500 - 1300$   
 $-66300$
  - $62 \times 199$                        $62 \times (200 - 1)$   
 $(62 \times 200) - (62 \times 1)$                        $12400 - 62$   
 $12338$

**G** 1. False 2. True 3. True 4. True 5. False 6. False

**H** One of the number = 12

Let another number =  $x$

According to Question  $12 \times x = -180, x = \frac{-180}{12} = -15$

**I** Let number divided be  $\Rightarrow \frac{x}{3} = -14$

$x = -14 \times 3 = 42$

## Chapter 2

### Fractions and Rational Numbers

**A** 1. Hours in a day = 24.  $\frac{8}{24} = \frac{1}{3}$

2. 1 hour = 60 minutes  $\frac{40}{60} = \frac{2}{3}$

3.  $\frac{1}{10}$

4.  $\frac{4}{5}$

**B** 1.  $\frac{2}{17}, \frac{3}{17}, \frac{5}{17}, \frac{8}{17}, \frac{10}{17}, \frac{16}{17}$  2.  $\frac{1}{10}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{2}$

3.  $\frac{4}{3}, \frac{17}{6}, \frac{19}{12}, \frac{7}{18}$

$$\frac{4 \times 60}{180} = \frac{240}{180}$$

$$\frac{3 \times 60}{180} = \frac{180}{180}$$

$$\frac{19 \times 15}{180} = \frac{285}{180}$$

$$\frac{12 \times 15}{180} = \frac{180}{180}$$

$$\frac{70}{180}, \frac{240}{180}, \frac{295}{180}, \frac{510}{180}$$

$$\frac{18}{18}, \frac{3}{18}, \frac{19}{12}, \frac{17}{6}$$

$$\frac{17 \times 30}{180} = \frac{510}{180}$$

$$\frac{6 \times 30}{180} = \frac{180}{180}$$

$$\frac{7 \times 10}{180} = \frac{70}{180}$$

$$\frac{18 \times 10}{180} = \frac{180}{180}$$

$$\frac{7}{18}, \frac{4}{3}, \frac{19}{12}, \frac{17}{6}$$

$$\frac{18}{18}, \frac{3}{18}, \frac{19}{12}, \frac{17}{6}$$

**C** 1.  $\frac{4}{14} + \frac{10}{7} + \frac{6}{8}$

$$\frac{16 + 80 + 42}{56} = \frac{138}{56}$$

$$= \frac{79}{28} = 2\frac{13}{28}$$

2	14, 7, 8
---	----------

2	7, 7, 4
---	---------

2	7, 7, 2
---	---------

7	7, 7, 1
---	---------

	1, 1, 1
--	---------

2.  $\frac{11}{16} - \frac{2}{5} + \frac{8}{10}$

$$\frac{55 - 32 + 64}{80} = \frac{87}{80} = 1\frac{7}{80}$$

2	16, 5, 10
---	-----------

2	8, 5, 5
---	---------

2	4, 5, 5
---	---------

5	2, 5, 5
---	---------

2	2, 1, 1
---	---------

	1, 1, 1
--	---------

3.  $7\frac{1}{6} - 2\frac{3}{42}$

$$\frac{43}{6} - \frac{87}{42} = \frac{301 - 87}{42} = \frac{214}{42} = 5\frac{2}{21}$$

$$4. 18\frac{2}{3} - 6\frac{10}{11}, \frac{56}{3} = \frac{76}{11}$$

$$\frac{616 - 228}{33} = \frac{388}{33} = 11\frac{25}{33}$$

$$5. 3\frac{2}{5} - \left(1\frac{1}{2} + 1\frac{3}{4}\right)$$

$$\frac{17}{5} - \left(\frac{3}{2} + \frac{7}{4}\right) \qquad \frac{17}{5} - \frac{3}{2} - \frac{7}{4}$$

$$\frac{68 - 30 - 35}{20} = \frac{3}{20}$$

$$6. 3\frac{1}{2} + 4\frac{3}{2} - 1\frac{1}{8}$$

$$\frac{7}{2} + \frac{19}{4} - \frac{9}{8} \qquad \frac{25 + 38 - 9}{8} = \frac{57}{8} = 7\frac{1}{8}$$

$$7. 7\frac{3}{5} - 7\frac{3}{5} - 7\frac{3}{5} + 7\frac{3}{5}$$

$$\frac{38}{5} - \frac{38}{5} - \frac{38}{5} + \frac{38}{5} = 0$$

$$8. \frac{3}{7} + \frac{5}{28}, \frac{12 + 5}{28} = \frac{17}{28}$$

$$9. 2\frac{1}{6} + 3\frac{1}{3}$$

$$\frac{13}{6} + \frac{10}{3} \qquad \frac{13 + 20}{6} = \frac{33}{6} = 5\frac{3}{6}$$

**D** Pieces cut by sonam = 18  
 Pieces eaten by her friend and her family = 13  
 Pieces of cake left = 18 - 13 = 5  
 Fraction =  $\frac{5}{18}$

**E** Total vegetables =  $2\frac{3}{5}$  kg =  $\frac{13}{5}$  kg  
 Patatoes used =  $1\frac{1}{5}$  kg =  $\frac{6}{5}$  kg,      Onion used =  $\frac{3}{9}$  kg  
 Tomatos used =  $\frac{1}{5}$  kg  
 Potatoes, onions and tomatoes used together =  $1\frac{1}{5} + \frac{3}{9} + \frac{1}{5}$



$$= \frac{54 + 15 + 9}{45} = \frac{78}{45}$$

$$\text{Cheese used} = \frac{13}{5} - \frac{78}{45} = \frac{117 - 78}{45} = \frac{39}{45} = \frac{13}{15} \text{ kg}$$

- F** Total no. of toffees = 18  
 No. of toffees distributed = 11  
 fraction of toffees distributed =  $\frac{11}{18}$

- G**  $\frac{1}{15} \text{ dm} = \frac{10}{15} \text{ cm}$   
 Perimeter =  $\frac{5}{9} + \frac{10}{15} + \frac{1}{10} = \frac{50 + 60 + 9}{90} = \frac{119}{90} = 1\frac{29}{90}$

- A** 1.  $\frac{5}{7} \times 2\frac{1}{10} = \frac{5}{7} \times \frac{21}{10} = \frac{3}{2}$       2.  $20 \times 13\frac{1}{5}, 20 \times \frac{66}{5} = 264$   
 3.  $6\frac{9}{10} \times 1\frac{1}{23} = \frac{69}{10} \times \frac{24}{23} = \frac{36}{5} = 7\frac{1}{5}$       4.  $\frac{81}{100} \times \frac{6}{7} = \frac{243}{350}$

- B** 1.  $\frac{1}{2} \times 24 \text{ cm} = 12 \text{ cm}$       2.  $\frac{2}{3}$  of 90 = 60  
 3.  $\frac{1}{10}$  of 28 m = 2.8 m      4.  $\frac{2}{3}$  of 6 kg = 4 kg  
 5.  $\frac{1}{7} \times 7 \text{ days} = 1 \text{ days}$       6.  $\frac{1}{6} \times 60 \text{ min} = 10 \text{ min}$   
 7.  $\frac{5}{12} \times 24 \text{ hours} = 10 \text{ hours}$       8.  $\frac{5}{6} \times 24 \text{ hours} = 20 \text{ hours}$

- C** No. of gift sets = 18    weight of one gift set =  $2\frac{1}{2} \text{ kg} = \frac{5}{2} \text{ kg}$

$$\text{Total weight} = \frac{5}{2} \times 18 = 45 \text{ kg}$$

- D** Earnings of Tonmay = 55000  
 Expenditure =  $\frac{3}{5} \times 55000 = 33000$

$$\text{His savings} = 55000 - 33000 = 22000$$

- E** Distance 1 = Speed  $\times$  Time =  $2\frac{1}{3} \times 2 = \frac{7}{3} \times 2 = \frac{14}{3} \text{ km.}$

$$\text{Distance 2} = \text{Speed} \times \text{Time}$$

$$= 1\frac{1}{2} \times 2 = \frac{3}{2} \times 2 = 3 \text{ km}$$

$$\text{Total distance} = \frac{14}{3} + 3 = \frac{14+9}{3} = \frac{23}{3} = 7\frac{2}{3}$$

**F** Amount of sugar =  $7\frac{1}{2}$  kg =  $\frac{15}{2}$  kg

$$\text{Cost of 1 kg sugar} = 25\frac{1}{2} \text{ kg} = \frac{51}{2} \text{ kg}$$

$$\text{Cost of } \frac{15}{2} \text{ kg sugar} = \frac{15}{2} \times \frac{51}{2} = \frac{765}{4} = 191\frac{1}{4}$$

**G** Amount of milk yielded per day =  $10\frac{5}{9}$  kg

$$\text{Weight of the milk yielded in 7 days} = \frac{95}{9} \times 7 = \frac{665}{9} = 73\frac{8}{9} \text{ kg}$$

**H** Total no. of Students = 30

$$\text{fraction of student who gave correct answer} = \frac{4}{5}$$

$$\text{No. of students who gave correct answer} = \frac{4}{5} \times 30 = 24$$

$$\text{No. of students who made mistakes} = 30 - 24 = 6 \text{ students}$$

**I** Total No. of periods = 6

$$\text{fraction of duration of each period} = \frac{2}{3} \text{ hours}$$

$$\text{Total duration of 6 periods} = \frac{2}{3} \times 6 = 4 \text{ hours}$$

**J** length =  $45\frac{1}{2}$  m =  $\frac{91}{2}$  m

$$\text{Bradth Q} = 16\frac{2}{3} = \frac{50}{3} \text{ m}$$

$$\text{perimeter} = 2(l + b) = 2\left(\frac{91}{2} + \frac{50}{3}\right)$$

$$\text{Perimeter} = 2\left(\frac{273+100}{6}\right) = 2 \times \frac{373}{6} = 124\frac{1}{3} \text{ m}$$

**K** Fraction of boys =  $\frac{5}{9}$ . No. of girls = 100

Let the total no. of students be  $x$ . A.T.Q

$$x - x \times \frac{5}{9} = 100$$

$$9x - 5x = 900$$

$$4x = 900$$

$$x = \frac{900}{4}$$

Total No. of students = 225

No. of boys =  $225 - 100 = 125$

$$1. 7 \div \frac{2}{5} = 7 \times \frac{5}{2} = \frac{35}{2} = 17\frac{1}{2} \quad 2. 11 \div \frac{1}{5} = 11 \times 5 = 55$$

$$3. 6 \div \frac{5}{7} = 6 \times \frac{7}{5} = \frac{42}{5} \quad 4. \frac{4}{9} \div \frac{2}{3} = \frac{4}{9} \times \frac{3}{2} = \frac{2}{3}$$

$$5. 5\frac{1}{2} \div 3\frac{1}{3} = \frac{11}{2} \div \frac{10}{3} = \frac{11}{2} \times \frac{3}{10} = \frac{33}{20} = 1\frac{13}{20}$$

$$6. 16\frac{1}{2} \div 5 = \frac{33}{2} \times \frac{1}{5} = \frac{33}{10} = 3\frac{3}{10} \quad 7. \frac{3}{7} \div \frac{6}{5} = \frac{3}{7} \times \frac{5}{6} = \frac{15}{42}$$

$$8. 2\frac{1}{5} \div \frac{3}{5} = \frac{11}{5} \times \frac{5}{3} = \frac{11}{3} = 3\frac{2}{3}$$

**B** 1.  $\left(\frac{3}{4} + \frac{5}{6}\right) \times 1\frac{2}{3} = \left(\frac{9+10}{12}\right) \times \frac{5}{3} = \frac{19}{12} \times \frac{5}{3} = \frac{95}{36} = 2\frac{23}{36}$

$$2. \left(2\frac{1}{7} \times 1\frac{3}{4}\right) \div \left(\frac{18}{23} \times \frac{5}{7}\right) = \left(\frac{15}{7} \times \frac{7}{4}\right) \div \left(\frac{18}{23} \times \frac{5}{7}\right)$$
$$\frac{15}{4} \times \frac{23}{18} \times \frac{7}{5} = \frac{161}{24} = 6\frac{17}{24}$$

$$3. \left(5\frac{1}{4} \times 5\frac{4}{5}\right) \div 1\frac{7}{8} = \left(\frac{21}{4} \times \frac{29}{5}\right) \div \frac{15}{8} = \frac{21}{4} \times \frac{29}{5} \times \frac{8}{15}$$
$$= \frac{406}{25} = 16\frac{6}{25}$$

$$4. \frac{5}{6} \div \frac{5}{6} = \frac{5}{6} \times \frac{6}{5} = 1$$

**C** 1.  $\frac{1}{3} = 3$

$$2. 11\frac{7}{13} = \frac{150}{13} = \frac{13}{150}$$

$$3. 10 = \frac{1}{10}$$

$$4. \frac{9}{11} = \frac{11}{9}$$

$$5. 10\frac{2}{13} = \frac{132}{13} = \frac{13}{132}$$

$$6. \frac{1}{9} = 9$$

$$7. 10\frac{1}{10} = \frac{101}{10} = \frac{10}{101}$$

$$8. 7\frac{1}{3} = \frac{22}{3} = \frac{3}{22}$$

**D** length of rope =  $7\frac{1}{2} = \frac{22}{2}$  m

No. of small ropes = 11

$$\text{Length of each of the small ropes} = \frac{22}{3} \div 11 = \frac{22}{3} \times \frac{1}{11} = \frac{2}{3}$$

**E** Cost of  $3\frac{1}{3}$  kg mangoes = 36

$$1. \text{ Cost of 1 kg mangoes} = 36 \div \frac{10}{3} = 36 \times \frac{3}{10} = \frac{108}{10} = 10\frac{4}{5}$$

$$2. \text{ Cost of } 5\frac{1}{2} \text{ kg mangoes} = 10\frac{4}{5} \times 5\frac{1}{2} = \frac{54}{5} \times \frac{11}{2} = \frac{207}{5} = 59\frac{2}{5}$$

**F** Let the other number be  $x$

A.T.Q

$$x \times \frac{7}{2} = \frac{5}{6}, x = \frac{5}{6} \div \frac{7}{2} = \frac{5}{6} \times \frac{2}{7} = \frac{5}{21}$$

**G** Cost of 15 stairs =  $1706\frac{1}{4}$

$$\text{Cost of 1 stairs} = 1706\frac{1}{4} \div 15 = \frac{6825}{4} \times \frac{1}{15} = \frac{455}{4} = 113\frac{3}{4}$$

**H**  $7\frac{1}{9} \div 6\frac{2}{9}, \frac{64}{9} \div \frac{56}{9}$

$$\frac{64}{9} \times \frac{9}{56}$$

$$\frac{8}{7} = 1\frac{1}{7}$$

**I** Amount of Milk = 24 litres

$$\text{Amount of milk each student got} = \frac{3}{5}$$

$$\text{No., of students} = 24 \div \frac{3}{5} = 24 \times \frac{5}{3} = 40 \text{ students}$$

**A** 1.  $\frac{-40}{160} = \frac{-1}{4}$

2.  $\frac{25}{-50} = \frac{-1}{2}$

3.  $\frac{18}{48} = \frac{3}{8}$

4.  $\frac{-60}{70} = \frac{-6}{7}$

5.  $\frac{-125}{50} = \frac{-5}{2}$

**B** Do it yourself

**C**  $\frac{-30}{77}$

**D** 1. Positive Rational No.

2. negative Rational No.

3. Negative rational No.  
5. Positive rational No.

4. Negative Rational No.

- E 1. Natural No.  
3. Integer  
5. Fraction

2. Fraction  
4. Integer  
6. Integer

F No, zero is neither negative nor positive, it is a rational number

G  $-17 = \frac{-34}{2}$

$-50 = -\frac{100}{2}$

H 1.  $\frac{-2}{7} \times \frac{2}{2} = \frac{-4}{14}$

2.  $\frac{-2}{7} \times \frac{3}{3} = \frac{-6}{21}$

3.  $\frac{-2}{7} \times \frac{4}{4} = \frac{-8}{28}$

4.  $\frac{-2}{7} \times \frac{5}{5} = \frac{-10}{35}$

I 1.  $\frac{0}{3} = 0$

2.  $\frac{0}{-3} = 0$

Yes they are equal

J 2.  $\frac{-108}{-27} = \frac{12}{3}$

K 1.  $\frac{-8}{14}$  and  $\frac{13}{21}$

$\frac{8 \times 3}{14 \times 3} = \frac{-24}{42}$

$\frac{13 \times 2}{21 \times 2} = \frac{26}{42}$

$\frac{-24}{42} \neq \frac{26}{42}$

2.  $\frac{-16}{20}$  and  $\frac{20}{-25}$

$\frac{-16 \times 5}{20 \times 5} = \frac{-80}{100}$

$\frac{-20 \times 400}{25 \times 400} = \frac{-80}{100}$

$\frac{-16}{20} = \frac{20}{-25}$

3.  $\frac{-9}{12}$  and  $\frac{8}{12}$

$\frac{-9}{12} \neq \frac{8}{12}$

L 1.  $\frac{-5}{7} < \frac{6}{13}$

$\frac{-4 \times 6}{5 \times 6} = \frac{-24}{30}$

$\frac{-24}{30} > \frac{-25}{30}$

3.  $\frac{-7}{8}$  and  $\frac{21}{-24}$

$-7 \times 3 = -21$

2.  $\frac{-4}{5} = \frac{-5}{6}$

$\frac{-5 \times 5}{6 \times 5} = \frac{-25}{30}$

$\frac{-4}{5} > \frac{-5}{6}$

$-7 < 21$

$$4. \frac{-9}{-10} > \frac{8}{9}$$

$$\frac{9 \times 9}{10 \times 9} = \frac{81}{90}$$

$$\frac{8 \times 10}{9 \times 10} = \frac{80}{90}$$

$$\frac{81}{90} > \frac{80}{90}$$

$$5. \frac{19}{21} < \frac{79}{80}$$

$$\frac{19 \times 80}{21 \times 80} = \frac{1520}{1680}$$

$$\frac{79 \times 21}{80 \times 21} = \frac{1659}{1680}$$

$$\frac{19}{21} < \frac{79}{80}$$

$$\begin{array}{r|l} 3 & 21, 80 \\ \hline 7 & 7, 80 \\ \hline 2 & 1, 80 \\ \hline 2 & 1, 40 \\ \hline 2 & 1, 20 \\ \hline 2 & 1, 10 \\ \hline 5 & 1, 5 \\ \hline & 1, 1 \end{array}$$

**A** 1. (b)      2. (a)

**B** 1.  $\frac{-8}{11} + \left(\frac{-4}{11}\right) = \frac{-8}{11} - \frac{4}{11} = \frac{-12}{11}$

2.  $-3 + \left(\frac{-3}{5}\right) = -3 - \frac{3}{5} = \frac{-15-3}{5} = \frac{-18}{5}$

3.  $\frac{-8}{19} + \left(\frac{-4}{57}\right)$

$$\frac{-24-4}{57} = \frac{-28}{57}$$

**C** 1.  $\frac{4}{9} - \left(-\frac{7}{9}\right) = \frac{4}{9} + \frac{7}{9} = \frac{11}{9}$       2.  $\frac{-9}{15} - 0 = \frac{-9}{15}$

3.  $\frac{-11}{14} - \left(-\frac{6}{7}\right) = \frac{-11}{14} + \frac{6}{7} = \frac{11+12}{14} = \frac{1}{14}$

**D** 1.  $\frac{6}{-5} \times \frac{9}{11} = \frac{-54}{55}$       2.  $\frac{9}{2} \times \frac{-7}{5} = \frac{-63}{10}$

3.  $\frac{3}{10} \times \frac{-19}{2} \times \frac{10}{19} = \frac{-3}{2}$       4.  $\frac{3}{-5} \times \frac{-5}{3} \times \frac{1}{7} = \frac{1}{7}$

5.  $\frac{16}{-5} \times \frac{3}{8} \times \frac{10}{3} = -4$       6.  $\frac{3}{7} \times \frac{-2}{7} \times \frac{5}{11} = \frac{-6}{77}$

**E** 1.  $-4 \times \frac{3}{2} = \frac{-12}{2} = -6$       2.  $\frac{2}{3} \times \frac{11}{5} = \frac{22}{15}$

3.  $3 \sqrt{65} \quad -15$       4.  $-4 \sqrt{1} \quad -1$

$$5. \frac{12}{-13} \times 26 = -24$$

$$6. \frac{-9}{11} \div \frac{-2}{3} = \frac{-9}{11} \times \frac{3}{-2} = \frac{27}{22}$$

**F** 1. L.H.S

$$\frac{-8}{7} \times \frac{19}{6} = \frac{-76}{21}$$

$$\text{R.H.S} \quad \frac{19}{6} \times \frac{-8}{7} = \frac{-76}{21}$$

$$2. \text{L.H.S} \left( \frac{9}{11} \times \frac{12}{13} \right) \times \frac{8}{22}$$

$$\frac{108}{143} \times \frac{8}{22} = \frac{432}{1573}$$

R.H.S

$$\frac{9}{11} \times \left( \frac{8}{22} \times \frac{22}{13} \right)$$

$$\frac{9}{11} \times \left( \frac{48}{143} \right)$$

$$\frac{432}{1573}$$

L.H.S = R.H.S

$$3. \text{L.H.S} \left( \frac{-8}{3} + \frac{-11}{12} \right) \times \frac{-3}{7}, \left( \frac{-32-11}{12} \right) \times \frac{-3}{7} = \frac{-43}{12} \times \frac{-3}{7} = \frac{43}{28}$$

$$\text{R.H.S} \left( \frac{-8}{3} \times \frac{3}{7} \right) + \left( \frac{-11}{12} \times \frac{3}{7} \right)$$

$$\frac{-8}{7} + \left( \frac{-11}{20} \right) = \frac{-32-11}{28} = \frac{-43}{28}$$

**G** Let the other number be  $x$

A.T.Q

$$x \times \frac{-8}{6} = \frac{-32}{18}, x = \frac{-32}{18} \div \left( \frac{-8}{6} \right) = \frac{-32}{18} \times \frac{-6}{8} = \frac{4}{3}$$

**H** 1.  $\frac{-3 \times 2}{2 \times 2} = \frac{-6}{4} = \frac{-3 \times 3}{2 \times 3} = \frac{-9}{6} = \frac{-3 \times 4}{2 \times 4} = \frac{-12}{8}$

$\frac{-6}{4}, \frac{-9}{6}$  and  $\frac{-12}{8}$  are equivalent rational of  $\frac{-3}{2}$

2.  $-1$

$\frac{-2}{2}, \frac{-3}{3}, \frac{-4}{4}$  are equivalent rational no. of  $-1$ .

3.  $\frac{3 \times 2}{7 \times 2} = \frac{6}{14} = \frac{3 \times 3}{7 \times 3} = \frac{9}{21}$

$$\frac{3}{7} \times \frac{4}{4} = \frac{12}{28}, \frac{6}{14}, \frac{9}{21} \text{ and } \frac{12}{28}$$

- I
- $\frac{1}{2}$  and  $\frac{1}{3}$ ,  $\frac{1}{2} \times \frac{15}{15} = \frac{15}{30}$ ,  $\frac{1}{3} \times \frac{10}{10} = \frac{10}{30}$   
 $\frac{11}{30}$ ,  $\frac{12}{30}$ ,  $\frac{13}{30}$  are three rational no. b/w  $\frac{1}{2}$  and  $\frac{1}{3}$
  - $\frac{1}{3}$  and  $\frac{1}{5}$   
 $\frac{1}{3} \times \frac{10}{10} = \frac{10}{30}$                        $\frac{1}{5} \times \frac{6}{6} = \frac{6}{30}$   
 $\frac{7}{30}$ ,  $\frac{8}{30}$ ,  $\frac{9}{30}$  are three rational no. b/w  $\frac{1}{3}$  and  $\frac{1}{5}$
  - $-4$  and  $-5$ ,  $-4.2$ ,  $-4.5$ ,  $-4.7 = \frac{17}{4}$ ,  $\frac{-18}{4}$ ,  $\frac{-19}{4}$

## Chapter 3

### Operation on Rational No.

- A
- $\frac{2}{3} + \left(\frac{-2}{3}\right) + \frac{1}{6} + \left(\frac{-8}{15}\right)$   
 $\frac{2}{3} - \frac{2}{3} + \frac{1}{6} - \frac{8}{15}$ ,  $0 + \frac{5-16}{30} = \frac{-11}{30}$
  - $2\frac{1}{5}$ ,  $\frac{-3}{20}$ ,  $-2\frac{1}{7}$ ,  $\frac{11}{5} + \left(\frac{-3}{20}\right) + \left(\frac{-15}{7}\right)$   
 $\frac{11}{5} - \frac{3}{20} - \frac{15}{7}$ ,  $\frac{308-21-300}{140} = \frac{-13}{140}$
  - $\frac{-9}{10} + \frac{22}{15} - \frac{13}{20} = \frac{-540+880-390}{600} = \frac{-50}{600}$   
 $= \frac{-1}{12}$
  - $\frac{-3}{7} + \frac{2}{9} + 0 + \frac{8}{7} - \frac{13}{7} = \frac{-3}{7} + \frac{2}{9} + \frac{8}{7} - \frac{13}{7}$

5	10, 15, 20
2	2, 3, 4
2	1, 3, 2
3	1, 3, 1
	1, 1, 1





**H** Vikram spends =  $3\frac{1}{2}$  hours

His site spends =  $2\frac{1}{4}$

Difference =  $3\frac{1}{2} - 2\frac{1}{4} = \frac{7}{2} - \frac{9}{4} = \frac{14-9}{4} = \frac{5}{4} = 1\frac{1}{4}$

**A** 1.  $\frac{7}{-3} \times \frac{-3}{7} = 1$

2.  $\frac{210}{256} \times \frac{128}{70} = \frac{-3}{2}$

3.  $\frac{7}{5} \times \frac{-40}{7} = -8$

4.  $-1\frac{2}{9} \times \frac{27}{55} = \frac{-11}{9} \times \frac{27}{55} = \frac{-3}{5}$

5.  $15 \times \frac{3}{105} = \frac{3}{7}$

6.  $17 \times \frac{-21}{84} = \frac{-17}{4}$  or  $-4\frac{1}{4}$

7.  $0 \times \frac{-21}{36} = 0$

8.  $\frac{-331}{441} \times 1 = \frac{-331}{441}$

**B** 1.  $\frac{441}{250} \times \frac{37}{21} \times \frac{125}{111} \times \frac{3}{5} \times -5 = \frac{-21}{2}$  or  $-10\frac{1}{2}$

2.  $\frac{-3}{19} \times \frac{15}{61} \times 0 \times \frac{18}{31} \times \frac{9}{41} = 0$

3.  $\frac{-9}{10} \times \frac{-5}{3} \times \frac{2}{3} = 1$

4.  $2\frac{1}{3} \times 24\frac{6}{7} \times 18\frac{1}{3}, \frac{7}{3} \times \frac{174}{7} \times \frac{55}{3} = \frac{3190}{3} = 1063\frac{1}{3}$

**C** 1.  $\left(\frac{7}{9} - \frac{11}{12}\right) \times \left(\frac{36}{5} + \frac{24}{7}\right), \left(\frac{28-33}{36}\right) \times \left(\frac{252+120}{35}\right)$

$\frac{-5}{36} \times \frac{372}{35} = \frac{-31}{21} = -1\frac{10}{21}$

2.  $\left(\frac{2}{-3} \times \frac{11}{12}\right) \times \left(\frac{-4}{15} \times \frac{-8}{-8}\right) - \frac{11}{18} \times \frac{-1}{6} = \frac{11}{108}$

3.  $\left(\frac{6}{55} \times \frac{22}{9}\right) - \left(\frac{26}{125} \times \frac{-10}{37}\right)$

$\frac{-4}{15} - \left(-\frac{4}{75}\right), \frac{-20+4}{75} = \frac{-16}{75}$

4.  $-2\frac{1}{5} \times \left(1\frac{4}{7} - \frac{5}{21}\right)$

$$= \frac{-11}{5} \times \left( \frac{11}{7} - \frac{5}{21} \right) = \frac{-11}{5} \times \left( \frac{33-5}{21} \right) = \frac{-11}{5} \times \frac{28}{21} = -\frac{44}{15} = -2\frac{14}{15}$$

**D**  $\left( \frac{3}{4} + \frac{7}{8} \right) \times \left( \frac{11}{13} + \frac{5}{26} \right)$   $\left( \frac{6+7}{8} \right) \times \left( \frac{22+5}{26} \right)$   
 $\frac{13}{8} \times \frac{27}{26} = \frac{27}{16} = 1\frac{11}{16}$

**E**  $1 - \left( \frac{2}{3} \times \frac{15}{27} \times \frac{45}{26} \right)$   $1 - \frac{25}{39}$   $\frac{39-25}{39} = \frac{14}{39}$

**F** 1.  $\frac{-29}{17}$  2. 1 3.  $\frac{2}{7}$  4. -1

**G**  $\frac{17}{11} \times \frac{33}{-5} = \frac{-51}{5} = -10\frac{1}{5}$

**H** 1.  $\frac{5}{11} \div \frac{-5}{22} = \frac{5}{11} \times \frac{-22}{5} = -2$  2.  $-6 \div \frac{18}{5} = -6 \times \frac{5}{18} = \frac{-5}{3}$

3.  $\frac{8}{9} \div 4 = \frac{8}{9} \times \frac{1}{4} = \frac{2}{9}$

4.  $3\frac{1}{7} \div \frac{11}{-13} = \frac{22}{7} \times \frac{-13}{11} = \frac{-26}{7} = -3\frac{5}{7}$

**I** 1.  $\left( \frac{1}{3} - \frac{1}{4} + \frac{1}{5} - \frac{1}{6} \right) \div \left( \frac{2}{5} - \frac{5}{9} + \frac{3}{5} - \frac{7}{18} \right)$   
 $\left( \frac{20-15+12-10}{60} \right) \div \left( \frac{36-50+54-35}{90} \right)$   
 $= \frac{7}{60} \div \frac{5}{90} = \frac{21}{10} = 2\frac{1}{10}$

2.  $\left[ \frac{7}{-12} \times \frac{-3}{14} \right] + \left[ \frac{-3}{5} \times \frac{-6}{15} \right] = \frac{1}{8} + \frac{18}{75} = \frac{75+144}{600} = \frac{219}{600} = \frac{73}{200}$

**J**  $\left( 2\frac{1}{5} + 5\frac{1}{5} \right) \div \left( 3\frac{1}{4} \times \frac{8}{13} \right)$   
 $\left( \frac{11}{5} + \frac{11}{5} \right) \div \frac{13}{4} \times \frac{8}{13} = \frac{22+55}{10} \times \frac{1}{2} = \frac{77}{10} \times \frac{1}{2} = \frac{77}{20} = 3\frac{17}{20}$

**K**  $\frac{-18}{35} \div \frac{-9}{7} = \frac{-18}{35} \times \frac{7}{-9} = \frac{2}{5}$

**L** Price of 12 books =  $181\frac{1}{5}$

Price of 1 book =  $181\frac{1}{5} \div 12 = \frac{906}{5} \times \frac{1}{12} = \frac{151}{10} = 15\frac{1}{10}$

M 1.  $\frac{-6}{22} = \frac{3}{11} = \frac{-15}{-55}$

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

5.  $\frac{-4}{-9} = \frac{8}{18} = \frac{12}{27}$

7.  $\frac{10}{7}$

9.  $\frac{12}{-40} = \frac{-3}{10}$

2.  $\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$

4.  $\frac{-5}{7} = \frac{-25}{35} = \frac{-35}{49}$

6.  $\frac{6}{-13} = \frac{-12}{26} = \frac{24}{-52}$

8.  $\frac{4}{5} - \frac{3}{10} = \frac{8-3}{10} = \frac{5}{10} = \frac{1}{2}$

N 1.  $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}$

2.  $\frac{-54}{77}, \frac{-52}{77}, \frac{-12}{77}, \frac{5}{77}, \frac{9}{77}, \frac{15}{77}, \frac{20}{77}, \frac{23}{77}, \frac{32}{77}, \frac{35}{77}$

A 1. (d)      2. (a)      3. (a)      4. (a)

5. (c)      6. (b)      7. (d)      8. (c)

B 1. False    2. True      3. True      4. False

5. True    6. True      7. True      8. True

9. True    10. True     11. True     12. False

13. False    14. True     15. True     16. False

C Money spent during lunch break =  $\frac{2}{5}$

Money spent after school =  $\frac{1}{8}$

Money spent for his younger brother =  $\frac{1}{6}$

Total money spent =  $\frac{2}{5} + \frac{1}{8} + \frac{1}{6} = \frac{48+15+20}{120} = \frac{83}{120}$

D Distance of Manju =  $3\frac{1}{5}$  km =  $\frac{16}{5}$

Distance off Niya =  $\frac{23}{7}$  km

$\frac{16 \times 7}{5 \times 7} = \frac{112}{35}$

$\frac{23}{7} \times \frac{5}{5} = \frac{115}{35}$

∴ Distance travelled by Niya is greater.

$$\frac{115}{35} - \frac{112}{35} = \frac{3}{35} \text{ By } \frac{3}{35} \text{ km}$$

**E** Distance travelled by bike in 1 hour =  $71\frac{4}{7}$  km =  $\frac{501}{7}$

Distance travelled by bike in 10 hours

$$= \frac{501}{7} \times 10 = \frac{5010}{7} = 715\frac{5}{7} \text{ km}$$

**F** Arjun paid more by  $175 - 125 = ₹50$

**G**  $30 \div \frac{15}{4}, 30 \times \frac{4}{15} = 8$

**Ans.** 8 pieces can be cut from rope of length 30 cm

**H**  $2\frac{9}{10} \div 3, \frac{29}{10} \times \frac{1}{3} = \frac{29}{30}$  kg

**Ans.** Each of them got  $\frac{29}{30}$  kg Chocolate

**I** 1 litre = 1000 ml

$$\frac{1000}{30} = 33\frac{1}{3} \text{ ink pens}$$

**J** Total No. of plates in 1 crate = 50

Total No. of plates in 11 crates =  $55 \times 11 = 550$  plates

No. of plates =  $550 \times \frac{2}{5} = 220$

Plates left intact =  $550 - 220 = 330$

**K** Milk give by lucy =  $5\frac{1}{2} \text{ l} = \frac{11}{2} \text{ l}$

Milk given by lucky =  $8\frac{5}{8} = \frac{69}{8} \text{ l}$

$$\frac{11}{2} \times \frac{8}{8} = \frac{88}{16}, \frac{69}{8} \times \frac{2}{2} = \frac{138}{16}$$

Lucky give more milk by  $\frac{138}{16} - \frac{88}{16}$

$$= \frac{50}{16} = \frac{25}{8} = 3\frac{1}{8} \text{ litre}$$

# Chapter 4 Exponents

**A**

1.  $\left(\frac{3}{7}\right)^3 = \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{27}{343}$
2.  $\left(\frac{-2}{5}\right)^2 = \frac{-2 \times -2}{5 \times 5} = \frac{4}{25}$
3.  $\left(\frac{-5}{9}\right)^4 = \frac{-5 \times -5 \times -5 \times -5}{9 \times 9 \times 9 \times 9} = -\frac{625}{6561}$
4.  $\left(\frac{3}{5}\right)^4 = \frac{3 \times 3 \times 3 \times 3}{5 \times 5 \times 5 \times 5} = \frac{81}{625}$
5.  $\frac{-1 \times -1 \times -1 \times -1 \times -1}{2 \times 2 \times 2 \times 2 \times 2} = \frac{-1}{32}$
6.  $\left(\frac{1}{3}\right)^6 = \frac{1 \times 1 \times 1 \times 1 \times 1 \times 1}{3 \times 3 \times 3 \times 3 \times 3 \times 3} = \frac{1}{729}$
7.  $(-1)^{1000} = 1$
8.  $\left(\frac{-2}{3}\right)^4 = \frac{2 \times 2 \times 2 \times 2}{3 \times 3 \times 3 \times 3} = \frac{16}{81}$

**B**

Rational Number	Exponential	Base	Exponent
$\frac{1}{243}$	$\left(\frac{1}{3}\right)^5$	$\frac{1}{3}$	5
$\frac{-8}{729}$	$\left(\frac{-2}{9}\right)^3$	$\frac{-2}{9}$	3
$\frac{625}{14641}$	$\left(\frac{5}{11}\right)^4$	$\frac{5}{11}$	4
$\frac{2401}{256}$	$\left(\frac{7}{4}\right)^4$	$\frac{7}{4}$	4
$\frac{8}{125}$	$\left(\frac{2}{5}\right)^3$	$\frac{2}{5}$	3
$\frac{-27}{64}$	$\left(\frac{-3}{4}\right)^3$	$\frac{-3}{4}$	3
$\frac{-1}{32}$	$\left(\frac{-1}{2}\right)^5$	$\frac{-1}{2}$	5

$\frac{25}{100}$	$\left(\frac{5}{10}\right)^2$	$\frac{5}{10}$	2
$P \times P \times P \times q \times q \times q \times r \times r \times r$	$(pqr)^3$	$pqr$	3
$(-2) \times (-2) \times 3 \times 5 \times (-2)$ $\times 5 \times 5 \times 3 \times 3$	$(-30)^3$	-30	3

- C**
- $4^2 = 4 \times 4 = 16$ ,  $2^4 = 2 \times 2 \times 2 \times 2 = 16$   
 $\therefore 4^2 = 2^4$
  - $3^4$  and  $8^2$                        $3 \times 3 \times 3 \times 3 = 81$   
 $8 \times 8 = 64$                        $\therefore 3^4 > 8^2$
  - $1^5$  and  $5^1$   
 $1^5 = 1$                                $5^1 = 5$   
 $\therefore 1^5 < 5^1$
  - $10^2$  and  $5^4$   
 $10^2 = 10 \times 10 = 100$        $5^4 = 5 \times 5 \times 5 \times 5 = 625$   
 $\therefore 10^2 < 5^4$

- $6^2$  and  $3^8$   
 $6^2 = 6 \times 6 = 36$   
 $3^8 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 19683$ ,  $6^2 < 3^8$
- $3^4$  and  $2^4$

$$3^4 = 3 \times 3 \times 3 \times 3 = 81$$

$$2^4 = 2 \times 2 \times 2 \times 2 = 16$$

$$3^4 > 2^4$$

- $3^2$  and  $2^3$ ,  $3^2 = 3 \times 3 = 9$ ,  $2^3 = 2 \times 2 \times 2 = 8$   
 $3^2 > 2^3$
- $5^2$  and  $3^3$ ,  $5^2 = 5 \times 5 = 25$ ,  $3^3 = 3 \times 3 \times 3 = 27$        $5^2 < 3^3$

- D**
- $(-1)^{81} = -1$
  - $2^2 + (-5)^3 = 4 + (-125) = 4 - 125 = -121$
  - $6 \times 10^3 = 6000$
  - $7^2 \times (-10)^3$ ,  $7 \times 7 \times (-10) \times (-10) \times (-10) = -49000$
  - $6^2 \div 3^2$ ,  $\frac{6 \times 6}{3 \times 3} = 4$
  - $2^8 \div 2^8 = 1$
  - $5^2 - 2^8 = 25 - 32 = -7$
  - $(-1)^{57} \times (-1)^{56} = -1 \times 1 = -1$
  - $(-1)^{18} + 16^2 = 1 + 256 = 257$

$$10. \left(\frac{12}{13}\right)^4 \times \left(\frac{12}{13}\right)^5 = \left(\frac{12}{13}\right)^{4+5} = \left(\frac{12}{13}\right)^9$$

$$11. 3^5 + \left(\frac{1}{15}\right)^5 \times 5^5 = 1$$

$$12. \left[\left(\frac{1}{2}\right)^3 + \left(\frac{3}{4}\right)^2\right] \times \left(\frac{-2}{3}\right)^3 \qquad \left(\frac{1}{8} + \frac{9}{16}\right) \times \left(\frac{-8}{3}\right)$$

$$\left(\frac{2+9}{16}\right) \times \frac{-8}{3} \qquad \frac{11}{16} \times \frac{-8}{3} = \frac{-11}{6} = -1\frac{5}{6}$$

- E**
- $9^x = 729, 9^x = 9^3, x = 3$
  - $(-2)^x = -128 - 2^x = -2^7, x = 7$
  - $(-12)^x = 20736, (-12)^x = (-12)^4, x = 4$
  - $(-10)^x = 1000000$   
 $(-10)^x = (-10)^6, x = 6$
  - $2^x = 1024, 2^x = 2^{10}, x = 10$
  - $\left(\frac{6}{7}\right)^x = \frac{7776}{16807}, \left(\frac{6}{7}\right)^x = \left(\frac{6}{7}\right)^5, x = 5$
  - $\frac{-64}{125} = \left(\frac{-4}{x}\right)^3, \frac{-64}{125} = \left(\frac{-4}{5}\right)^3, x = 5$
  - $\frac{16}{81} = x^4, \frac{16}{81} = \left(\frac{2}{3}\right)^4 = x = \frac{2}{3}$

- A**
- $\left(\frac{2}{3}\right)^0 \div \left(\frac{2}{3}\right)^0 = 1 \div 1 = 1$
  - $\left(\frac{5}{6}\right)^6 \times \left(\frac{5}{6}\right)^4 = \left(\frac{5}{6}\right)^{10}$
  - $\left[\left(\frac{-6}{5}\right)^3\right]^8 = \left(\frac{-6}{5}\right)^{24}$
  - $(2^0 \times 3^0 \times 4^0) + (5^0 \times 6^0 \times 7^0) = 1 + 1 = 2$
  - $\left(\frac{12}{17}\right)^2 \times \left(\frac{12}{17}\right)^5 \times \left(\frac{12}{17}\right)^{10} = \left(\frac{12}{17}\right)^{17}$
  - $\left(\frac{-2}{3}\right)^3 \times \left(\frac{2}{3}\right)^4 = \left(\frac{-2}{3}\right)^3 \times \left(\frac{-2}{3}\right)^4 = \left(\frac{-2}{3}\right)^7$
  - $(3^7 \div 3^3) \times 3^3 = 3^{7-3} \times 3^3 = 3^4 \times 3^3 = 3^7$
  - $(2^{-4})^{-2} = 2^8$





**C** 1.  $(7^0 + 3^0) \times (8^0 + 5^0), (1+1) \times (1+1)$

$$2 \times 2 = 4$$

2.  $\left(\frac{18}{35}\right)^{19} \div \left(\frac{18}{35}\right)^{19}, \left(\frac{18}{35}\right)^{19-19} = \left(\frac{18}{35}\right)^0 = 1$

3.  $\left(\frac{-7}{8}\right)^3 \div \left(\frac{-7}{8}\right)^5, \left(\frac{-7}{8}\right)^{3-5} = \left(\frac{-7}{8}\right)^{-2} = \left(\frac{-8}{7}\right)^2 = \frac{-64}{49}$

4.  $\left[\left(\frac{-3}{4}\right)^5 \times \left(\frac{-3}{4}\right)^3\right] \div \left(\frac{9}{16}\right)^4, \left(\frac{-3}{4}\right)^8 \div \left(\frac{-3}{4}\right)^8, \left(\frac{-3}{4}\right)^0 = 1$

5.  $\frac{\left(\frac{-3}{4}\right)^4 \times \frac{125}{27}}{\left(\frac{5}{3}\right)^2 \times \frac{9}{16}}$

$$= \frac{\left(\frac{-3}{4}\right)^4 \times \left(\frac{5}{3}\right)^3}{\left(\frac{5}{3}\right)^2 \times \left(\frac{-3}{4}\right)^2} = \left(\frac{-3}{4}\right)^{4-2} \times \left(\frac{5}{3}\right)^{3-2} = \left(\frac{3}{4}\right)^2 \times \left(\frac{5}{3}\right)^1 = \frac{45}{48} = \frac{15}{16}$$

6.  $\left[\left(\frac{6}{7}\right)^3\right]^2 \div \left[\left(\frac{6}{7}\right)^2\right]^3, \left(\frac{6}{7}\right)^6 \div \left(\frac{6}{7}\right)^6 = \left(\frac{6}{7}\right)^{6-6} = \left(\frac{6}{7}\right)^0 = 1$

**D** 1.  $8 \times 2^{x+2} = 32$

$$2^3 \times 2^{x+2} = 32$$

$$2^{x+5} = 2^5$$

$$x + 5 = 5$$

$$x = 0$$

2.  $\left(\frac{125}{8}\right)^5 \times \left(\frac{125}{8}\right)^x = \left(\frac{5}{2}\right)^{18} = \left(\frac{125}{8}\right)^5 \times \left(\frac{125}{8}\right)^x = \left(\frac{125}{8}\right)^{15}$

$$= \left(\frac{125}{8}\right)^{5+x} = \left(\frac{125}{8}\right)^{15}, x + 5 = 15$$

$$x = 15 - 5 = 10$$

3.  $\left(\frac{2}{9}\right)^3 \times \left(\frac{2}{9}\right)^6 = \left(\frac{2}{9}\right)^{2x-1} = \left(\frac{2}{9}\right)^9 = \left(\frac{2}{9}\right)^{2x-1}$

$$2x - 1 = 9, 2x = 10, x = 5$$

4.  $\left(\frac{2}{3}\right)^2 \times \left(\frac{2}{3}\right)^9 = \left(\frac{2}{3}\right)^{3x+2} = \left(\frac{2}{3}\right)^{11} = \left(\frac{2}{3}\right)^{3x+2}$

$$3x + 2 = 11, 3x = 11 - 2, 3x = 9, x = 3$$

$$5. \left(\frac{3}{2}\right)^{-3} \div \left(\frac{3}{2}\right)^6 = \left(\frac{3}{2}\right)^{2x+1}, \left(\frac{3}{2}\right)^{-3-6} = \left(\frac{3}{2}\right)^{2x+1}$$

$$-9 = 2x + 1, 2x = -10$$

$$x = -5$$

$$6. x^3 = \left(\frac{6}{5}\right)^{-3} \times \left(\frac{6}{5}\right)^6 = \left(\frac{6}{5}\right)^{-3+6} = \left(\frac{6}{5}\right)^3, x = \frac{6}{5}$$

**E**

$$1. \frac{(3^3)^3 \times 8^4}{9^4 \times 4^5 \times 4^3}$$

$$= \frac{3^9}{3^8} \times \frac{(2^3)^4}{(2^2)^5 \times (2^2)^3} = 3^{9-8} \times \frac{2^{12}}{2^{16}} = 3 \times \frac{2^{-4}}{2^{16}} = 3 \times 2^{-4} = \frac{3}{16}$$

$$2. \frac{16^2 \times 9^4 \times 27}{6^3 \times 12^4}$$

$$= \frac{(4 \times 4)^2 \times (3^2)^4 \times 3^3}{(3 \times 2)^3 \times (3 \times 4)^4} = \frac{4^2 \times 4^2 \times 3^8 \times 3^3}{3^3 \times 2^3 \times 3^4 \times 4^4} = \frac{3^4}{8} = \frac{81}{8}$$

$$3. \frac{12^4 \times 9^4 \times 4^2}{6^4 \times 8^3 \times 3^4} = \frac{(4 \times 3)^4 \times 3^8 \times 2^4}{(2 \times 3)^4 \times (4 \times 2)^3 \times 3^4}$$

$$= \frac{4^4 \times 3^4 \times 3^8 \times 2^4}{2^4 \times 3^4 \times 4^3 \times 2^3 \times 3^4} = \frac{4^{4-3} \times 3^{8-4}}{2^3} = \frac{4 \times 3^4}{2^3} = \frac{81}{2^{3-2}} = \frac{81}{2}$$

$$4. \frac{4^6 \times x^4 \times y^3 (2^2)^6 \times x^{4-3} \times y^{3-2}}{2^8 \times x^3 \times y^2} = \frac{2^8 \times x^4 \times y^3 \times 2^8 \times x^1 \times y^1}{2^8 \times x^3 \times y^2}$$

$$= 2^{12-8} \times x^1 \times y^1 = 2^4 xy = 16xy$$

**F**

$$5. 5^{-1} \times x = (2)^1$$

$$x = 2 \div 5^{-1} = 2 \div \frac{1}{5} = 2 \times 5 = 10$$

**G**

$$(-15)^{-1} \div x = (-5)^{-1}$$

$$\frac{-1}{15} \times x = (-5)^{-1}, x = (-5)^{-1} \times (-15)^1 = (75)^{-2}$$

**H**

$$1. (50 \div 5)^2 = (10)^2 = 10^2$$

$$2. 3^{18} \times 3^7 \div 3^{25}, 3^{25} \div 3^{25}, 3^0 = 10^0$$

$$3. \left(\frac{-8}{51}\right)^5 \div \left[\left(\frac{-8}{21}\right)^2 \times \left(\frac{-8}{21}\right)^3\right], \left(\frac{-8}{21}\right)^5 \div \left(\frac{-8}{21}\right)^5$$

$$\left(\frac{-8}{21}\right)^{5-5} = \left(\frac{-8}{21}\right)^0 = 1 = 10^0$$

$$4. (5^5 \times 2^5) \times (5 \times 2)^3, 5^5 \times 5^3 \times 2^5 \times 2^3$$

5.  $(10^3)^2 = 10^6$   
 6.  $(200)^8 \times (50)^8, (200 \times 50)^8, (10000)$   
 $(10^4)^8 = 10^{32}$

- A** 1.  $6.57 \times 10^6$                       2.  $8.758 \times 10^7$   
 3.  $5.3 \times 10$                             4.  $3.59 \times 10^{17}$   
 5.  $1.001 \times 10^3$                       6.  $1.552 \times 10^3$   
 7.  $7.03 \times 10^6$                       8. 1,68,200
- B** 1.  $4 \times 10^9 + 6 \times 10^8 + 8 \times 10^7 + 9 \times 10^6 + 2 \times 10^5 + 5 \times 10^2$   
 $+ 6 \times 10^1 + 4 \times 1$   
 2.  $3 \times 10^8 + 2 \times 10^7 + 5 \times 10^4 + 4 \times 10^3 + 6 \times 10^1 + 2 \times 1$   
 3.  $4 \times 10^6 + 8 \times 10^5 + 1 \times 10^4 + 3 \times 10^3$   
 4.  $6 \times 10^7 + 8 \times 10^5 + 8 \times 10^3$   
 5.  $8 \times 10^6 + 2 \times 10^5 + 6 \times 10^4 + 5 \times 10^3 + 2 \times 10^3 + 8 \times 10^1 + 7 \times 1$   
 6.  $4 \times 10^9 + 9 \times 10^8 + 8 \times 10^5 + 7 \times 10^4 + 1 \times 10^2 \times 5 \times 1$   
 7.  $5 \times 10^4 + 5 \times 1$   
 8.  $3 \times 10^4 + 6 \times 10^3 + 5 \times 10^2$
- C**  $2.568 \times 10^6$  g
- D** 1. 138500                      2. 500000000000                      3. 165205  
 4. 8007605043021                      5. 62750000000                      6. 10008001000

1. (d)      2. (a)                      3. (a)                      4. (a)  
 5. (a)      6. (a & c)                      7. (a)                      8. (b)
- B** 1. True    2. False                      3. False                      4. False  
 5. True    6. True                      7. False                      8. True  
 9. True    10. False
- C** 1. 5                      2. 10                      3. 25                      4. 17  
 5. 3                      6. 6                      7. 9/16  
 8.  $(5 \times 9)^4 = (45)^4$                       9.  $9 - 4 = 5$                       10.  $3^0 = 1$   
 11.  $m - n$                       12. 58206000
- D** 1.  $(1010)^2$                       2.  $(11)^4$                       3.  $2^7$
- E** 1. 6320000                      2.  $4056 \times 10^5$
- F** 1.  $2.85 \times 10^8$                       2.  $1.728 \times 10^6$
- G** 1.  $\left[ \left( \frac{8}{-} \right)^{17} \div \left( \frac{8}{-} \right)^2 \right] \times \left( \frac{8}{-} \right)^2$

$$= \left(\frac{8}{19}\right)^{17-2} \times \left(\frac{8}{19}\right)^2 = \left(\frac{8}{19}\right)^{15} \times \left(\frac{8}{19}\right)^2 = \left(\frac{8}{19}\right)^{17}$$

$$2. \frac{3^8 \times 3^3 \times 5^8 \times 5^0}{(3 \times 5)^5} = \frac{3^{11} \times 5^8}{3^5 \times 5^5} = 3^6 \times 5^3$$

**H** 1.  $\frac{3^5 \times 10^5 \times 35}{5^7 \times 6^5} = \frac{3^5 \times (5 \times 2)^5 \times 5 \times 7}{5^7 \times (3 \times 2)^5} = \frac{3^5 \times 5^5 \times 5 \times 7 \times 2^5}{5^7 \times 3^5 \times 2^5}$

$$= \frac{5^6}{5^7} \times 7 = 5^{-1} \times 7 = \frac{7}{5}$$

2.  $\frac{27^2 \times (-m)^5 \times n^2}{18^3 \times m^2 n} = \frac{9^2 \times 3^2}{9^3 \times 2^3} \times -m^2 n = \frac{-m^2 n}{2^3}$

3.  $\frac{343 \times 69a^7 b^5}{5ba^3 b^2} = \frac{7^3 \times 8^2 \times a^{7-3} b^{5-2}}{7 \times 8}$

$$7^2 \times 8 \times a^4 b^3 = 49 \times 8 \times a^4 b^3 = 392 a^4 b^3$$

4.  $(3^{20} \div 3^{15}) \times 3^5, 3^5 \times 3^5 = 3^{10}$

## Chapter 5

### Algebraic Expression

**A** 1.  $x - 3y$                       2.  $\frac{x}{y} - 5$                       3.  $2x - 10$                       4.  $d = 2r$

**B** No. of days in a week = 7  
 No. of days in 3 weeks =  $7 \times 3 = 21$   
 Expenditure per week =  $21x$ , Savings per week =  $3y$   
 Salary =  $21x + 3y$

**C**  $x - y = 7p$

**D** Total score =  $x + 67$

**E**  $5x = z - y$

**A** 1.  $x^{12}$                                       2.  $4a^4 b^4$   
 3.  $7x^3 y^3 z^2$                               4.  $6a^3 b^2$

**B** 1  $4 \times a \times r \times r \times r \times v \times v \times v$

2.  $2 \times x \times x \times x \times y \times y \times y \times y$
3.  $15 \times x \times x \times y \times y \times z \times z \times z \times z$
4.  $a \times a \times b \times b \times b$

- C**
- |              |              |              |
|--------------|--------------|--------------|
| 1. Monomial  | 2. Binomial  | 3. Binomial  |
| 4. Monomial  | 5. Binomial  | 6. Trinomial |
| 7. Trinomial | 8. Trinomial |              |

- A**
1. 3 terms :  $ab, bc, ca$
  2. 3 terms:  $7x^2y, -4x^2y, 5x^2y$
  3. 3 terms :  $a, bc, bd$
  4. 2 terms :  $a^2b$  and  $ab^2$
  5. 3 terms :  $3ab, 4ab, 7bc$
  6. 2 terms :  $x^3, -y^3$

- B**
- |             |             |              |
|-------------|-------------|--------------|
| 1. Monomial | 2. Monomial | 3. Trinomial |
| 4. Binomial | 5. Monomial | 6. Binomial  |

- C**
1.  $-5/7$
  2.  $3/4$
  3.  $-3$
  4.  $-1$
  5.  $1$
  6.  $-7$

- D**
1. (a)  $2y$  (b)  $-3y^3$  (c)  $-5x^2$  (d)  $-6c^2$  (e)  $5y^2z^3$
  2. (a)  $(5x + y^2)z^3$  (b)  $-y^3(3z^4 + x^2)$

- E**
1.  $a^2, -2a^2$
  2.  $x^2, -3x^2$
  3.  $a^2x, -xa^2 \leftarrow ax, xa$
  4.  $6m^2pn, m^2np$
  5.  $2xy^2z, 5xy^2z, 3y^2xz$

- F**
1.  $(3x^2 + x^2), (-2y^2 - y^2 + 3y^2)(z^2 + z^2)$
  2.  $(2ab - 3ab)(3ab^2 + 4ab^2)(-a^2b + 5a^2b)$
  3.  $(5xy^2z - 2xy^2z)(3xyz^2 + xyz^2)$

- G**
1.  $a - 3b + 2c = 1 - 3(-1) + 2(0) = 1 + 3 = 4$
  2.  $2a + b - c = 2(1) + (-1) - 0 = 2 - 1 = 1$
  3.  $a^3 + b^3 + 3ab^2 + 3a^2b$   
 $(1)^3 + (-1)^3 + 3(1)(-1)^2 + 3(1)^2(-1)$   
 $1 + (-1) + 3 - 3 = 0$

- H**
1.  $a + b - c, 2 + 1 - 0 = 3$
  2.  $a \times b + c, 2 \times 1 + 0 = 2$
  3.  $a + b \times c, 2 + 1 \times 0 = 2$

- I**
1.  $x^2 + y^2 + z^2 = (6)^2 + (3)^2 + (2)^2 = 36 + 9 + 4 = 41$
  2.  $x \div y + xy, 6 \div 3 + 6 \times 3 = 2 + 18 = 20$
  3.  $4 \times 6 \times 3 + 6 - 4 + 6 \times 2 \div 3$

70 . 2 . 10 . 2 74 . 4 70

$$4. xy \div z - zy = 6 \times 3 \div 2 - 3 \times 2 = 18 \div 2 - 6 = 9 - 6 = 3$$

$$5. x^2y - 2xy^2 + 3z^2, (6)^2 \times 3 - 2 \times 6 \times (3)^2 + 3(2)^2$$

$$36 \times 3 - 2 \times 6 \times 9 + 3 \times 4 = 108 - 108 + 12 = 12$$

**J**

$$1. 2x^2y + a^2x^2y^2$$

$$= 2(2)^2 \times 3 + (1)^2(2)^2(3)^2 = 2 \times 4 \times 3 + 4 \times 9 = 24 + 36 = 60$$

$$2. x^5 - x^4 + x^3 - x^2 + x - 3$$

$$= (-1)^5 - (-1)^4 + (-1)^3 - (-1)^2 + (1) - 3$$

$$= (-1) - (1) - 1 - 1 - 1 - 3 = -5 - 3 = -8$$

$$3. 3x^4 - 2x^3 - x^2 + x - 3$$

$$= 3(2)^4 - 2(2)^3 - (2)^2 + 2 - 3 = 48 - 16 - 4 + 2 - 3$$

$$= 28 + 2 - 3 = 30 - 3 = 27$$

$$4. x^2 + 9x + 3^2 = (2)^2 + 3 \times 2 + 3^2 = 4 + 6 + 9 = 19$$

$$5. 2a^3 - 3a^2 + a + 5$$

$$2(-2)^3 - 3(-2)^2 + (-2) + 5 = 2 \times (-8) \times 3 \times 4 + (-2) + 5$$

$$= -16 - 12 - 2 + 5 = -30 + 5 = -25$$

**A**  $3x - 9 = 12$                        $3x = 12 + 9$

$$3x = 21$$

$$x = 7$$

No, 4 is not a root of alone equal

**B**  $x - 5 = 0$

$$x = 0 + 5$$

$$x = 5$$

5 is the root of this equation

**C**  $x + 3 = 9$                                        $x = 9 - 3$

$$x = 6$$

6 is the value of  $x$

**D**  $\frac{x}{9} = 14$      $x = 14 \times 9 = 126$

**E** 1.  $5 - x = 3$                                        $-x = 3 - 5$

$$-x = -2$$

$$x = 2$$

$$\text{Check } 5 - 2 = 3$$

Verified

2.  $x - 16 = 10$                                        $x = 10 + 16$

$$x = 26$$

$$\text{Check } 26 - 16 = 10$$

3.  $11x + 13 = -20$                                        $11x = -20 - 13$

$$11x = -33$$

$$x = -3$$

$$\text{Check } 11(-3) + 13 = -33 + 13 = 20$$

$$4. \quad 3x - x = 8 \qquad 2x = 8 \\ x = 4$$

$$\text{Check } 3(4) - 4$$

$$12 - 4 = 8$$

$$5. \quad x + (x + 2) = (x + 4) + 31, \quad x + x + 2 = x + 4 + 31 \\ 2x - x = 4 + 31 - 2 \qquad x = 33$$

$$6. \quad x + 2x = 9, \quad 3x = 9 \\ x = 3$$

$$7. \quad \frac{x}{9} = 6 \quad x = 54$$

$$8. \quad x + 5x + 7 = 25, \quad 6x + 7 = 25, \quad 6x = 25 - 7, \quad 6x = 18 \\ x = 3$$

$$9. \quad \frac{x}{4} - 4 = -1, \quad \frac{x}{4} = -1 + 4, \quad \frac{x}{4} = 3, \quad x = 3 \times 4 \\ x = 12$$

$$10. \quad y - \frac{1}{2} = 3, \quad y = 3 + \frac{1}{2} = \frac{6+1}{2} = \frac{7}{2} = y$$

$$11. \quad 14 + 2n - 6 + 8n = 4n - 21 + n + 34 \\ 2n + 8n - 4n - n = -21 + 34 - 14 - 16 \\ 5n = 5, \quad n = 1$$

$$12. \quad x + 3x + 6 = 14 \\ 4x = 14 - 6, \quad 4x = 8, \quad x = 2$$

$$13. \quad x + 3 = 15 + \frac{x}{2}, \quad x - \frac{x}{2} = 15 - 3, \quad \frac{x}{2} = 12 \\ x = 24$$

$$14. \quad \frac{7x+3}{2} = 19, \quad 7x+3 = 38, \quad 7x = 38-3, \quad 7x = 35, \quad x = 5$$

$$15. \quad 2(m+7) = 3(m-10) \\ 2m+14 = 3m-30 \\ 2m-3m = -30-14, \quad -m = -44 \Rightarrow m = 44$$

$$16. \quad 7(x-4) + 13 = 6 \\ 7x - 28 + 13 = 6 \\ 7x - 15 = 6 \\ 7x = 6 + 15 \\ 7x = 21 \\ x = 3$$



$$17. \frac{x}{2} = 4, x = 8, 3x + 2, 3(8) + 2, 24 + 2 = 26$$

$$18. 4x = 12, x = 3$$

$$\text{Putting in } -x + \frac{3}{x} + 2, -3 + \frac{3}{3} + 2 = 0$$

**A** 1. (c) 2. (b) 3. (b) 4. (c) 5. (a)

**B** 1.  $21y + 21x$  2.  $8x = q - p$

3.  $(75x + 45y)g$

**C** 1.  $18y^5$  2.  $12a^4b^2$

3.  $\frac{5}{a^4}$  4.  $x^5$

**D** 1. Monomial 2. Binomial

3. Binomial 4. Trinomial

**E** 1.  $-7xz$  2.  $6q$  3.  $-5$

**F** 1.  $9m - 16 = 20$   $9m = 20 + 16$

$9m = 36$   $m = 4$

2.  $9(n + 14) = 27, x + 14 = \frac{37}{9}, x = 3 - 14, x = -11$

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

$\frac{x}{3} - \frac{x}{2} = -3, \frac{2x - 3x}{6} = -3, -x = -18$

$x = 18$

4.  $3(p + 2) = 18, p + 2 = 6$

$p = 4$

5.  $\frac{3x}{2} = 1 = \frac{11}{2}, \frac{3x}{2} = \frac{11}{2} - 1$

$\frac{3x}{2} = \frac{11 - 2}{2}, 3x = 9$

$x = 3$

6.  $\frac{x}{3} - 5 = 7, \frac{x}{3} = 12, x = 36$

7.  $15(x - 9) - 2(x - 12) + 5(x + 6) = 0$

$15x - 135 - 2x + 24 + 5x + 30 = 0$

$$18x = 81, x = \frac{81}{18} = \frac{9}{2}$$

## Chapter 6

### Ratio and Proportion

**A** 1. 20 to 150,  $\frac{20}{150} = 2 : 15$

2. 2 hours to 300 minutes

$$1 \text{ hour} = 60 \text{ min}$$

$$2 \text{ hour} = 2 \times 60 = 120 \text{ min}$$

$$\text{Ratio} = \frac{120}{300} = \frac{4}{10} = \frac{2}{5} = 2 : 5$$

3. 700 ml to 1 litre, 1 l = 1000 ml

$$\text{Ratio} = \frac{700}{1000} = 7 : 10$$

4. 840 m to 1.4 km

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

$$1.4 \text{ km} = 1400$$

$$\text{Ratio} = \frac{840}{1400} = \frac{3}{5} = 3 : 5$$

**B** Earnings = 955

Saving = 185

1.  $\frac{185}{955} = \frac{37}{191} = 37 : 191$

2. Expenditure = 955 - 185 = 770

$$\text{Ratio} = \frac{955}{770} = 191 : 154$$

3.  $\frac{185}{770} = 37 : 154$

**C** 1. 3 : 4 or 7 : 9

$$\frac{3}{4} \times \frac{9}{9} = \frac{27}{36}, \frac{7}{9} \times \frac{4}{4} = \frac{28}{36}$$

2. 8 : 35 and 11 : 47

11 : 47 is greater

3. 19 : 19 and 15 : 51

$$\frac{19}{19} = 1$$

$$\frac{15}{51} = \frac{5}{17} = 0.29$$

19 : 19 > 15 : 51

4. 9 : 3 and 4 : 3

$$\frac{9}{3} = 3, \frac{4}{3} = 1\frac{1}{3}$$

9 : 3 > 4 : 3

5. 3 : 13 and 2 : 12

$$\frac{3 \times 12}{13 \times 12} = \frac{36}{156}, \frac{2 \times 13}{12 \times 13} = \frac{26}{156}, 3 : 13 > 2 : 12$$

6. 4 : 9 and 12 : 17

$$\frac{4}{9} \times \frac{17}{17} = \frac{68}{153}, \frac{12}{17} \times \frac{9}{9} = \frac{126}{153}, 4 : 9 < 12 : 17$$

**D** 8, 16, 6, 12,  $\frac{8}{16} = \frac{6}{12}$ , 8 : 16 :: 6 : 12

**E** 1.  $x : 5 :: 28 : 35$ ,  $\frac{x}{5} = \frac{28}{35}$ ,  $x = 4$

2. 16 : 64 :: 27 :  $x$

$$\frac{16}{64} = \frac{27}{x}, x = \frac{27 \times 64}{16}, x = 108$$

3. 6 :  $x = 11 : 55$

$$\frac{6}{x} = \frac{11}{55}, \frac{6 \times 55}{11} = x, x = 30$$

**F**  $\frac{5}{x}$  If 5,  $x$ , 5 are in proportion  $\frac{5}{x} = \frac{x}{5}$ ,  $25 = x^2$ ,  $x = 5$

**G**  $\frac{6}{36} = 1 : 6$ ,  $\frac{30}{216} = 1 : 6$

As 6 : 36 :: 30 : 216

∴ They are in continued proportion.

**H** Total no. of teachers = 56

No. of lady teachers = 42

No. of male teachers = 56 - 42 = 14

1. Ratio of male teachers to lady teacher =  $\frac{14}{42} = 1 : 3$

2. Ratio of lady teacher to male teachers =  $\frac{42}{14} = 3 : 1$
3. Ratio of male teachers to total no. of teachers =  $\frac{14}{56} = 1 : 4$

1. Price of 30 notebook = 420.20  
 Price of 1 notebook =  $\frac{420.20}{30}$   
 Price of 15 notebooks =  $\frac{420.20}{30} \times 15 = 210.10$
2. Cost of 84 km = 189  
 Cost of 1 km =  $\frac{189}{84}$   
 Cost of 136 km =  $\frac{189}{84} \times 136 = 306$
3. Consumption of sugar of 4 members = 6 kg  
 Consumption of sugar for 1 member =  $\frac{6}{4}$  kg  
 Consumption of sugar for 6 member =  $\frac{6}{4} \times 6 = 9$  kg
4. Weight of 1 bag = 40 kg  
 Weight of 25 bag =  $40 \times 25 = 1000$  kg  
 1000 kg wheat costs = 2750  
 Weight of 35 bags weighing 50 kg =  $35 \times 50 = 1750$  kg  
 1000 kg wheat costs = 2750  
 1 kg =  $\frac{2750}{1000} = 2.75$   
 1750 kg wheat costs =  $1750 \times 2.75 = 4812.5$
5. Distance covered in 5 hours = 4000  
 Distance covered in 1 hour =  $\frac{4000}{5}$   
 Distance covered in 3 hours =  $800 \times 3 = 2400$  km
6. 20 kg weight contains = 40 table  
 5000 kg weight contains =  $\frac{5000}{20} \times 40 = 10000$  tables

$$\text{Wages of 1 labourer} = \frac{3450}{30}$$

$$\text{Wages of 12 more labourers } (30 + 12) = 42 = \frac{345}{3} \times 4 = 4830$$

8. No. of juices in 1 carton = 15

$$\text{No. of juices in 32 carton} = 32 \times 15 = 480$$

$$\text{No. of juices in 24 cartons containing 14 juices}$$

$$= 24 \times 14 = 336$$

$$\text{Cost of 480 juices} = 8640$$

$$\text{Cost of 3336 juices} = \frac{336 \times 8640}{480} = 6048$$

**A** 1.  $\frac{3}{100} \times 100 = 3\%$

2.  $\frac{53}{100} \times 100 = 53\%$

3.  $\frac{9}{10} \times 100 = 90\%$

4.  $\frac{4}{25} \times 100 = 16\%$

**B** 1.  $2 : 25, \frac{2}{25} \times 100 = 8\%$

2.  $8 : 25, \frac{8}{25} \times 100 = 32\%$

3.  $2 : 50, \frac{2}{50} \times 100 = 4\%$

4.  $\frac{20}{100} \times 100 = 20\%$

**C** 1.  $0.02, \frac{2}{100} \times 100 = 2\%$

2.  $0.275, \frac{275}{1000} \times 100 = 27.5\%$

3.  $0.023 = \frac{23}{1000} \times 100 = 2.3\%$

4.  $0.09 \frac{9}{100} \times 100 = 9\%$

**D** 1.  $136\% = \frac{136}{100} = 1 \frac{36}{100}$

2.  $250\% = \frac{250}{100} = 2 \frac{1}{2}$

3.  $300\% = \frac{300}{100} = 3$

**E** 1. 17% of 45 km,  $\frac{17}{100} \times 45 = 7.65$

2. 70% of 30,  $\frac{70}{100} \times 30 = 21$

3. 40% of 400 kg  $\frac{40}{100} \times 400 = 160$  kg

4. 80% of 150 = 120

**A** 1.  $CP = \text{Loss} + S.P$        $C.P = 32 + 1254 = 1286$

2.  $S.P = C.P + \text{Profit} = 720 + 55.50 = 775.50$

3.  $\text{Profit} = S.P - C.P = 1350 - 1200 = 150$

**B** 1.  $C.P = 500$        $S.P = 600$        $S.P > C.P$

$\text{Profit} = 600 - 500 = 100$

2.  $C.P = S.P - \text{Profit} = 2392 - 120.50 = 2271.50$

**C** Total cost Price  $45200 + 2800 = 48000$

Selling Price = 46800

$C.P > S.P$

$\text{Loss} = 48000 - 46800$

$\text{Loss} = 1200$

$\text{Loss \%} = \frac{\text{Loss}}{C.P} \times 100 = \frac{1200}{48800} \times 100$

$\text{Loss \%} = 2.5\%$

**D** Do it yourself

**E**  $C.P = 452000 + 28000 = 480000$

$S.P = 468000$

$C.P > S.P$

$\text{Loss} = 480000 - 468000$

$\text{Loss} = 12000$

$\text{Loss \%} = \frac{12000}{480000} \times 100 = 2\frac{1}{2}\%$

**F** Cost of 12 mangoes = 3.75

Cost of 1600 mangoes =  $\frac{3.75 \times 1600}{12} = 500 = C.P$

S.P.

Selling Price of 2 mangoes = ₹1

Selling price of 900 mangoes =  $\frac{900}{2} = 450$

Selling price of 5 mangoes = ₹2

Selling price of 700 mangoes =  $\frac{700 \times 2}{5} = \frac{1400}{5} = 280$

Total selling price = 450 + 280 = 730

$S.P > C.P$

$\text{Profit \%} = \frac{730 - 500}{500} \times 100 = 46\%$

**G** S.P = 1200, Loss = 200  
 C.P = 1200 + 200 = 1400

Gain% = 10

$$\text{Gain\%} = \frac{SP - CP}{CP} = 100$$

$$10 = \frac{SP - 1400}{1400} \times 100$$

$$140 = SP - 1400$$

$$SP = 1400 + 140$$

$$S.P = 1540$$

**A** T = ?

$$P = 250$$

$$R = 8\%$$

$$S.I = 330 - 250 = 80$$

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

$$\frac{80 \times 100}{8 \times 250} = T$$

$$\frac{100}{25} = t$$

$$\text{Time} = 4 \text{ years}$$

$$2. P = 8000$$

$$R = 8\%$$

$$t = 4\frac{1}{2}$$

$$S.I = \frac{P \times R \times T}{100} = \frac{8000 \times 8 \times 9}{100 \times 2} = 2880$$

$$\text{Amount} = P + I = 8000 + 2880 = 10880$$

$$3. P = x, A = \frac{7}{4}x, t = 16, R = ?$$

$$I = A - P$$

$$\frac{7}{4}x - x = \frac{7x - 4x}{4} = \frac{3x}{4}$$

$$\frac{3x}{4} = \frac{x \times R \times 16}{100}, \frac{3 \times 100}{4 \times 16 \times x} = R, \frac{75}{16} = R, 4\frac{11}{16}\% = R$$

4. Do it yourself

5. Do it yourself

**A** 1. (c) 2. (c) 3. (a) 4. (c) 5. (a)

**B**  $\frac{7}{14} = \frac{25}{x}, \frac{7}{14} = \frac{1}{2}$

$$\text{If, } x = 50 \quad \frac{25}{50} = \frac{1}{2} \quad \therefore x = 50$$

**C** 8 men reap field in = 24 days

$$32 \text{ men will reap in} = \frac{8 \times 24}{32} = 6 \text{ days}$$

**D** Rani's saving in 12 month = 12522

$$\text{Rani's saving in 1 month} = \frac{12522}{12}$$

$$\text{Rani's savings in 3 months} = \frac{12522 \times 3}{12} = 3130.5$$

**E** Time taken by 6 oil tanks =  $4\frac{1}{2} = \frac{9}{2}$  hours

$$\text{Time taken by 1 oil tanks} = \frac{9}{2} \times \frac{1}{6} = \frac{3}{4} \text{ hours}$$

$$\text{Time taken by 4 oil tanks} = \frac{3}{4} \times 4 = 3 \text{ hours}$$

**F** Cost of 1 dozen pencil = 2.25

$$\text{Cost of 36 dozen} = 2.25 \times 36 = 81$$

**G** 1.  $1\frac{3}{5} = \frac{8}{5} \times 100 = 160\%$     2.  $\frac{8}{25} = \frac{8}{25} \times 100 = 32\%$

$$3. \frac{5}{20} = \frac{5}{20} \times 100 = 25\%$$

**H** 1.  $5 : 6, \frac{5}{6} \times 100 = \frac{250}{3} \%$

$$2. 2 : 5, \frac{2}{5} \times 100 = 40\%$$

$$3. 12 : 25, \frac{12}{25} \times 100 = 48\%$$

**I** 1.  $0.002, \frac{2}{100} \times 100 = 0.2\%$

$$2. 2.05, \frac{205}{100} \times 100 = 205\%$$

$$3. 0.003, \frac{63}{1000} \times 100 = 6.3\%$$

**J**

**K** Total No. of students = 720

No. of boys = 280

No. of girls =  $720 - 280 = 440$

$$1. \text{ Ratio of toys to girls} = \frac{280}{440} = 7 : 11$$

$$2. \text{ Ratio of total no. of students to girls} = \frac{720}{440} = 18 : 11$$



L 1.  $\frac{1}{4} \times 100 = 25\%$                       2.  $\frac{7}{20} \times 100 = 35\%$

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

M Cost of 75 km = ₹ 215  
 Cost of 120 km =  $\frac{215 \times 120}{75} = \frac{1720}{5} = 344$

N 18 kg load = 45 chairs  
 4000 kg =  $\frac{4000 \times 45}{18} = 10000$  chairs

M  $S.I. = \frac{P \times R \times T}{100}$   
 $4200 = \frac{29400 \times R \times 6}{100}$                        $R = \frac{4200}{294 \times 6}$   
 $R = \frac{100}{42}$                                        $R = 2\frac{8}{21}\%$

P C.P of television = 12000  
 Loss = 20% =  $12000 \times \frac{20}{100} = 2400$   
 S.P = 12000 - 2400 = 10600  
 C.P of Refrigerator = 12000  
 Gain % = 20% =  $12000 \times \frac{20}{100} = 2400$

S.P. = 12000 + 2400 = 14400  
 Total S.P. = 10500 + 14400 = 25000  
 C.P. = 24000  
 S.P > C.P

Profit of 25000 - 24000 = 1000

Q 1.  $P = 7250$ ,                       $R = 15\%$                        $T = 3$  years

$I = \frac{P \times R \times T}{100} = \frac{7250 \times 15 \times 3}{100} = ₹ 3262.5$

2.  $P = 25000$                                        $R = 8\%$

$T = 2\frac{1}{2} = \frac{5}{2}$  years =  $\frac{25000 \times 8 \times 5}{100} = ₹ 5000$

3.  $P = 240$                                        $R = 12\%$

$T = 2$  years                                       $I = \frac{P \times R \times T}{100}$

$$= \frac{240 \times 12 \times 2}{100} = ₹57.6$$

R 1.  $S.I = 240$

$$T = 2 \qquad R = 12\%$$

$$P = \frac{S.I \times 100}{T \times R} = \frac{240 \times 100}{12 \times 2} = 1000$$

2.  $S.I = 448$

$$T = 8 \text{ months} = \frac{8}{12} = 3 \text{ years} \qquad R = 8\%$$

$$P = \frac{S.I \times 100}{T \times R} = \frac{448 \times 100 \times 3}{2 \times 8} = ₹8400$$

S 1.  $P = 200$

$$S.I = 40$$

$$T = 4 \text{ years}$$

$$R = \frac{100 \times S.I}{P \times T} = \frac{100 \times 40}{200 \times 4} = 5\%$$

2.  $P = 2500$

$$S.I = 1500$$

$$T = 4 \text{ years}$$

$$R = \frac{100 \times 1500}{2500 \times 4} = 15\%$$

3.  $P = 8500$

$$S.I = 1275$$

$$T = 3 \text{ years}$$

$$R = \frac{100 \times 1275}{8500 \times 3} = 5\%$$

4.  $P = 4550$

$$S.I = 1638$$

$$T = 3 \text{ years} \qquad R = \frac{1638 \times 100}{4550 \times 3} = 12\%$$

## Chapter 7

### Lines, Angles and Transversals

A 1. No      2. No      3. No

B 1. No      2.  $\angle POQ$  and  $\angle QOR$  are a pair of adjacent angles.

**D**  $180 - 472 = 108^\circ$

**E** 1.  $2x - 10 + 3x + 15 = 180^\circ$  (Linear Pair)

$5x + 5 = 180^\circ, 5x = 175^\circ$

$x = \frac{175}{5} = 35^\circ$

$\therefore \angle POR = 2x - 10$

$2(35) - 10$

$70 - 10 = 60^\circ$

$\angle ROQ = 3x + 15 = 3(35) + 15 = 105 + 15 = 120^\circ$

2.  $x + 25 + x - 15 = 180^\circ$  (Linear Pair)

$2x + 10 = 180^\circ, 2x = 170^\circ, x = 85$

$\therefore \angle MOL = x + 25 = 85 + 25, \angle LON = x - 15$

$85 - 15 = 70^\circ$

**F** Linear Pair =  $\angle ROP$  and  $\angle POS, \angle POS$  and  $\angle SOQ, \angle SOQ$   
and  $\angle QOR, \angle QOR$  and  $\angle ROP$

Vertically opp Angles =  $\angle POS$  and  $\angle ROQ, \angle ROQ, \angle POR$   
and  $\angle SOQ$

**A** 1.  $QM \parallel PN; PL \parallel MO; LN \parallel QO$

2.  $AB \parallel DC; EF \parallel HG; AE \parallel DH; BF \parallel CG; BC \parallel FG;$   
 $AD \parallel EH$

3.  $QR \parallel TS; QT \parallel RS$

4.  $PQ \parallel SR; PS \parallel QR$

**B** 1. No 2. No 3. Yes 4. Yes

**C** PQ and RS are not parallel because if they would be parallel then  $\angle 1 = \angle 8$

**D**  $\angle PQD = \angle APQ$  (Alternate Interior Angles)

$\therefore \angle PQD = 130^\circ$

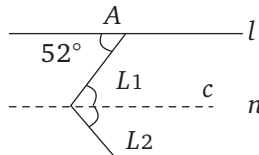
**E** Let us draw a line parallel to  $l$  and  $m$  so that

$\angle A = \angle 1$  (Alternate Interior is) =  $52^\circ$

$\angle B = \angle 2$  (Alternate Interior angles)

=  $43^\circ$

$\angle x = \angle 1 + \angle 2 = 95^\circ$



- A** 1.  $\angle AOB$  and  $\angle BOC$  are a pair of adjacent angles.  
 2.  $\angle AOB$  and  $\angle BOC$  are a pair of adjacent angles.  
 3.  $\angle ACD$  and  $\angle CAB$  are not a pair of adjacent angles.
- B** 1.  $6x + 4x = 180^\circ$  (Linear Pair)  
 $10x = 180^\circ, x = 18^\circ, 6x = 6 \times 18 = 108^\circ$   
 $4x = 4 \times 18 = 72^\circ$   
 2.  $x + 120^\circ = 180^\circ, x = 60^\circ$
- C** Do it yourself
- D** 1. No      2.      No      3.      Yes
- E**  $\angle x = \angle RQP = 60^\circ$  (VOA)  
 $\angle y = \angle PRQ = 50^\circ$  (VOA)
- F**  $\angle 1 = \angle 2 = 43^\circ$  (Alternate Interior Angles)  
 $\angle 1 = \angle 5$  (Interior Angles)  
 $\angle 1 + \angle 3 = 180^\circ$  (Linear Pair)  
 $43^\circ + \angle 3 = 180^\circ$   
 $\angle 3 = 180^\circ - 43$   
 $\angle 3 = 137^\circ$   
 $\angle 3 = \angle 4$  (Alternate Interior Angles)
- G**  $\angle a = 70^\circ$  (Vertically opposite angle)  
 $\angle a = \angle c$  (Interior angles on the same side of transversal)  
 $\angle b = 105^\circ$  (Vertically opposite Angle)  
 $\angle b = \angle d$  (Interior angle on the same side of transversal)
- H**  $\angle 1 = \angle 2 = 70^\circ$
- I**  $\angle 1 = \angle 5 = 71^\circ$   
 (Exterior angles on the same side of transversal)  
 $\angle 1 = \angle 3 = 71^\circ$  (Vertically opposite angle)  
 $\angle 5 = \angle 7 = 71^\circ$  (Vertically opposite angle)  
 $\angle 7 + \angle 6 = 180^\circ$  (Linear Pair)  
 $71^\circ + \angle 6 = 180^\circ$   
 $\angle 6 = 180 - 71 = 109^\circ$   
 Similarly,  $\angle 6 = \angle 2 = 109^\circ$   
 $\angle 2 = \angle 4 = 109^\circ$

# Chapter 8

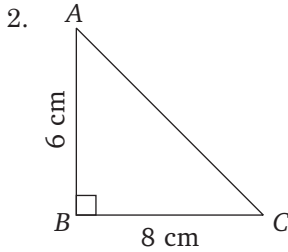
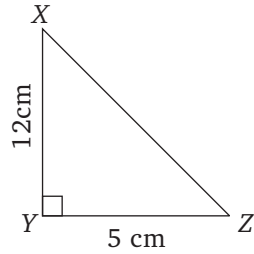
## Properties of Triangles

- A** For a triangle sum of all angles should be equal to  $180^\circ$
- $70^\circ + 60^\circ + 50^\circ = 180^\circ$   
 $\therefore ABC$  is a triangle
  - $70^\circ + 90^\circ + 70^\circ = 230^\circ \neq 180^\circ$   
 $PQR$  is not a triangle
  - $40^\circ + 40^\circ + 40^\circ = 120^\circ \neq 180^\circ$   
 $XYZ$  is not a triangle.
- B**
- $\angle ACD = \angle B + \angle A$
  - $\angle EAB = \angle B + \angle C$
  - $\angle FBC = \angle A + \angle C$
- C**
- $x + 60^\circ = 140^\circ, x = 80^\circ$
  - $50^\circ + 80^\circ + x = 180^\circ$  (Angle sum property)  
 $x = 180^\circ - 130^\circ$   
 $x = 50^\circ$
  - $2x + 3x = 30^\circ = 180^\circ$  (Angle sum property)  
 $5x = 150^\circ$   
 $x = 30^\circ$   $\angle BAC = 2x = 60^\circ$   $\angle ABC = 3x = 90^\circ$
  - $x + 90^\circ + 40^\circ = 180^\circ$   
 $x = 180 - 130$   
 $x = 50^\circ$
  - $\angle DAC = \angle ACD$  (Alternate Interior Angle)  
 $55^\circ + 70^\circ + x = 180^\circ$   
 $125 + x = 180$   
 $x = 180^\circ - 125^\circ$   
 $x = 55^\circ$
  - $\angle ABC = 180^\circ - 120^\circ = 60^\circ$  (Linear Pair)  
 $\angle ACB = 180^\circ - 120^\circ = 60^\circ$  (Linear Pair)  
 $x + 60 + 60^\circ = 180^\circ$   
 $x = 60^\circ$

7.  $\angle ABC = 90^\circ$ ,  $90^\circ + 40^\circ + x = 180^\circ$   
 $x = 180^\circ - 130^\circ$ ,  $x = 50^\circ$

A 1. No 2. Yes 3. No 4. Yes

B 1.  $xy^2 + yz^2 = (xz)^2$   
 $12^2 + 5^2 = (xz)^2$   
 $144 + 25 = (xz)^2$   $169 = (xz)^2$   
 $13 \text{ cm} = xz$



$$8^2 + 6^2 = AC^2$$

$$64 + 36 = AC^2$$

$$100 = AC^2$$

$$10 \text{ cm} = AC$$

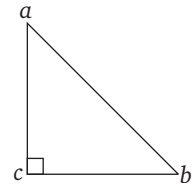
C 1.  $AC^2 = AB^2 + CB^2$   $25^2 = 24^2 + x^2$   
 $625 - 576 = x^2$   $49 = x^2$   
 $x = 7 \text{ cm}$

2.  $(1765)^2 = x^2 + (84)^2$   $(1765)^2 - (84)^2 = x^2$   
 $3115225 - 7056 = x^2$   $3108169 = x^2$   
 $x = 1763 \text{ cm}$

3.  $x^2 = 12^2 + 9^2 = 144 + 81 = 225$ ,  $x = 15 \text{ cm}$

4.  $(41)^2 = (40)^2 + x^2$   $(41)^2 - (40)^2 = x^2$   
 $1681 - 1600 = x^2$   $81 = x^2$   
 $9 = x$

D 1. If  $a = 6$   
 $b = 8$   
 $c^2 = 6^2 + 8^2$   
 $= 36 + 64 = 100$   
 $c = 10 \text{ cm}$



2.  $l^2 = (13)^2 - (12)^2$   $b^2 = 169 - 144$   
 $b^2 = 25$   $b = 25 \text{ cm}$

3.  $a^2 = c^2 - b^2$   $a^2 = (25)^2 - (24)^2$   
 $a^2 = 625 - 576$   $a^2 = 49$   $a = 7 \text{ cm}$

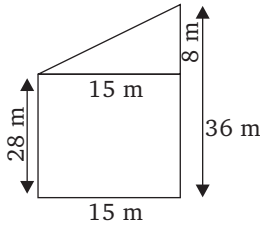
$$c^2 = 144 + 81$$

$$c^2 = 225$$

$$c = 15 \text{ cm}$$

**E** 1, 2, 5 can form a right angles triangle.

**F**



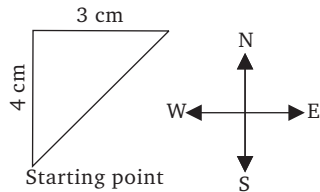
$$(\text{Distance between tops of tower})^2 = 8^2 + 15^2 = 64 + 225 = 289$$

Distance between tops of the tower = 17 m

**G**  $(\text{Distance})^2 = (4)^2 + (3)^2$

$$= 16 + 9 = 25$$

$$\text{Distance} = 5 \text{ km}$$

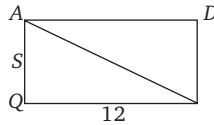


**H**  $AC^2 = BC^2 + AB^2$

$$= (12)^2 + (5)^2$$

$$= 144 + 25 = 169$$

$$AC = 13 \text{ m}$$



**I** Let  $AB$  be the height of the window from the ground

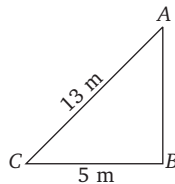
$$AC^2 - CB^2 = AB^2$$

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

$$169 - 25 = AB^2$$

$$144 = AB^2$$

$$12 \text{ m} = AB$$



**J** Let the distance be  $x$

$$x^2 = (12)^2 + (9)^2 = 144 + 81 = 225$$

$$x = 15 \text{ km}$$

**A** 1. (a) 2. (b) 3. (a) 4. (b) 5. (a)

**B** 1. Yes 2. Yes

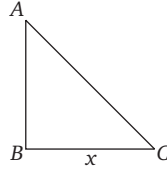
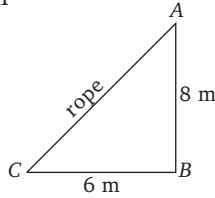
**C** 1, 2, 3

**D**  $72 = x^2 + x^2$   
 $72 = 2x^2$ ,  $x^2 = \frac{72}{2}$ ,  $x^2 = 36$

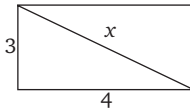
$x = 6$

The equal sides are 6 cm

**E**  $AC^2 = AD^2 + CB^2$   
 $= 8^2 + 6^2$   
 $= 64 + 36 = 100$   
 $AC = 10 \text{ m}$



**F**  $x^2 = 4^2 + 3^2$   
 $= 16 + 9$   
 $= 25$ ,  $x = 5 \text{ m}$



**G** According to figure  $AB^2 = AD^2 + BD^2$   
 $= (4)^2 + (3)^2 = 16 + 9 = 25$   $\therefore AB = 5 \text{ m}$

**H** According to given fig.  $AC^2 - AD^2 = CD^2$   
 $(13)^2 - (12)^2 = CD^2$ ,  $169 - 144 = CD^2$   
 $25 = CD^2$

$5 \text{ cm} = CD = DB = 5 \text{ cm}$

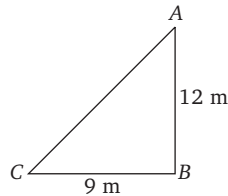
$CD + DB = CB$

$5 \text{ cm} + 5 \text{ cm} = CB$

$CB = 10 \text{ cm}$

**I** Let AC be the length of the ladder

$AC^2 = AB^2 + BC^2$   
 $= (12)^2 + (9)^2$   
 $= 144 + 81 = 225 = 15^2$   
 $AC = 15 \text{ cm}$



## Chapter 9

### Symmetry

A Do it yourself

B Do it yourself



- A** Do it yourself  
**B** Angle or rotation =  $45^\circ$   
order of rotational symmetry = 8  
**C** 1.  $180^\circ$  2.  $60^\circ$   
3. No rotational symmetry

**A** Do it yourself

**B** Do it yourself

**C** H, O, S, X, Z

**D** 1.  $90^\circ$  2.  $72^\circ$

3. No rotational symmetry

**E-I** Do it yourself

**A** Do it yourself

**B** F, G, J, L, N, P, Q

**C** Do it yourself

**D**  $120^\circ$ ,  $180^\circ$ ,  $240^\circ$ ,  $300^\circ$ ,  $360^\circ$

**E** 3

**F** 1. 4 2. 2 3. 2

**G** Do it yourself

**H** 1. Yes 2. Yes 3. No 4. Yes 5. Yes 6. Yes

## Chapter 10

### Representation of 3D in 2D

Do it yourself

**A** 1. Vertices 9, edges 9 2. Vertices 7 edges 7

**B** 1. HD, HG and HE 2. ABCD and ABFE

3. EFGH

4. AEHD, BFGC, DHGC and AEFB

**C** Do it yourself


















Do it yourself

**A** 16

**B** 1. 2      2. 5      3. 1      4. 5, 8

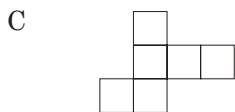
**C** 7 tiffin boxes

1.     
 Top View      Front View      Side View
2.     
 Top View      Front View      Side View
3.     
 Top View      Front View      Side View
4.     
 Top View      Front View      Side View
5.     
 Top View      Front View      Side View

Chapter Check-up

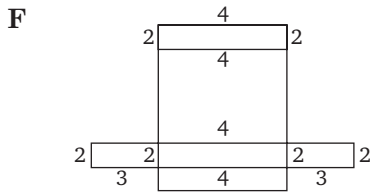
**A** Do it yourself

**B** Hidden vertex  $U_1$  Hidden edges :  $QU, TU, VW$ , hidden faces  $TVWU, PQUT, QSUW$



D Vertices : 4, Edges, 5

E 1. Represents a cube



G Do it yourself

H Do it yourself

I 1. Cap, Icecream cone  
2. Glass, Gas Cylinder

J 1. Cube 2. Cuboid 3. Cone 4. Cylinder

K 11 boxes

## Chapter 11

A 1.  $AB \cong BC \cong CD \cong DA$

2.  $AB \cong AC \cong BC$

3.  $PS \cong QR, PQ \cong SR$

B  $\angle DOB$

C Yes

D 1. They have same measure 2. They have same radius

3. They have equal length and equal breadth

4. They are of equal length

A. In the given fig.

In  $\triangle RPQ$  and  $\triangle QSR$

$PQ = SR$  (given)

$PR = QS$  (given)

$QR = QR$  (common)

$\therefore \triangle RPQ \cong \triangle QSR$  {SSS criteria}

- B** 1. In  $\triangle ADC$  and  $\triangle ABC$   
 $AD = BC$  (given)  
 $AB = DC$  (given)  
 $AC = AC$  (common)  
 $\triangle ADC \cong \triangle ABC$  (SSS criteria)
2. SSS 3.  $AC$  is common in both
- C** 1. In  $\triangle XOY$  and  $\triangle XOZ$   
 $\angle YXO = \angle ZXO$  ( $\because XO$  bisects  $\angle X$ )  
 $XO = XO$  (common)  
 $\angle XOY = \angle XOZ = 90^\circ$  (given)  
 $\triangle XOY \cong \triangle XOZ$
2. As  $XO$  bisects  $\angle X$  therefore  $\angle YXO = \angle ZXO$   
 $XO$  is common in both  
 $\angle XOY$  and  $\angle XOZ = 90^\circ$  (given)
3. Yes,  $XY = XZ$  as congruent parts of congruent triangles are equal.
- D**  $\angle OLN = \angle MLN$   
 $\angle ONL = \angle MNL$  ( $\because LP$  bisects  $\angle MLO$  and  $\angle MNO$ )  
 $LN = NL$   
 $\therefore \triangle LMN \cong \triangle LON$  {By ASA criteria}
- E** 1. We have  $\triangle ABC \cong \triangle RPQ$   
 So,  $A \leftrightarrow R, B \leftrightarrow P, C \leftrightarrow Q$   
 $AB = RP, BC = PQ, AC = RQ$   
 $\angle A = \angle R, \angle B = \angle P, \angle C = \angle Q$
2. We have,  $\triangle ABC \cong \triangle PQR$   
 So,  $A \leftrightarrow P, B \leftrightarrow Q, C \leftrightarrow R$   
 $AB = PQ, BC = QR, AC = PR$   
 $\angle A = \angle P, \angle B = \angle Q, \angle C = \angle R$
3. We have,  $\triangle ABC \cong \triangle QPR$   
 So,  $A \leftrightarrow Q, B \leftrightarrow P, C \leftrightarrow R$   
 $AB = QP, BC = PR, AC = QR$   
 $\angle A = \angle Q, \angle B = \angle P, \angle C = \angle R$
- F** In  $\triangle ABD \cong \triangle ACD$   
 $AB = AC$  (given)  
 $\angle ADB = \angle ADC = 90^\circ$   $AD = AD$  (common)  
 $\therefore \triangle ABD \cong \triangle ACD$   
 $\therefore \angle B = \angle C$  (C.P.C.T.)



# Chapter 12 Construction

Do it yourself

Do it yourself

Chapter Check-up

Do it yourself

Chapter 13

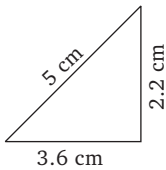
Perimeter and Area

**A** 1.  $3\text{ cm} + 3\text{ cm} + 1\text{ cm} + 3\text{ cm} + 1\text{ cm} + 3\text{ cm} + 3\text{ cm} + 3\text{ cm} + 1\text{ cm} + 3\text{ cm} + 1\text{ cm} + 3\text{ cm} = 28\text{ cm}$

2.  $5\text{ cm} + 1\text{ cm} + 2\text{ cm} + 4\text{ cm} + 1\text{ cm} + 4\text{ cm} + 2\text{ cm} + 1\text{ cm} = 20\text{ cm}$

**B** 1.  $2.3 + 4.4 + 3 = 9.7\text{ cm}$       2.  $3.5 + 3.5 + 3.8 = 10.8\text{ cm}$

3.



$$2.2 + 3.6 + 5 = 10.8\text{ cm}$$

4. Perimeter of lake =  $2(l + b)$   
 $= 2(220 + 90) = 2(310) = 620\text{ m}$

**D** Perimeter of square =  $4 \times \text{side} = 4 \times 1.5 = 6.0\text{ m}$

**E** Perimeter of triangle = sum of all side

Let the third side be  $x$

$$15 + 29 + x = 64$$

$$39 + x = 64$$

$$x = 64 - 39 = 25\text{ cm}$$

**F** Perimeter of rectangle =  $2(l + l)$

$$300 = 2(70 + l)$$

$$\frac{300}{2} = 70 + h$$

$$150 - 70 = b$$

$$80 \text{ cm} = b$$

- G**
- Perimeter of square =  $4 \times \text{side}$   
 $= 4 \times 3 = 12 \text{ m}$
  - Perimeter of rectangle =  $2(l + b) = 2(30 + 20) = 2 \times 50 = 100 \text{ cm}$

- A**
- Circumference =  $2\pi r = 2 \times \frac{22}{7} \times 35 = 220 \text{ cm}$
  - Circumference =  $2\pi r = \frac{2 \times 22}{7} \times 2.8 = 17.6 \text{ cm}$
  - Circumference =  $2 \times \frac{22}{7} \times 200 = \frac{8800}{7} = 1257.14 \text{ cm}$

- B**
- Diameter = 14 cm  
 Radius = 7 cm  
 Circumference =  $2\pi r = \frac{2 \times 22}{7} \times 7 = 44 \text{ cm}$
  - Diameter = 9.8 cm  
 Radius = 4.9 cm  
 Circumference =  $2\pi r = \frac{2 \times 22}{7} \times 4.9 = 30.8 \text{ cm}$
  - Diameter = 20  
 Radius = 10  
 Circumference =  $2\pi r$   
 $= 2 \times \frac{22}{7} \times 10 = \frac{440}{7} = 62.8 \text{ cm}$

- C**
- Circumference =  $2\pi r$   
 Radius =  $\frac{\text{Circumference}}{2\pi} = \frac{52.8}{2 \times 22} \times 7 = 8.4 \text{ cm}$
  - Radius =  $\frac{264 \times 7}{2 \times 22} = 42 \text{ cm}$
  - Radius =  $\frac{484 \times 7}{2 \times 22} = 77 \text{ cm}$

- D**
- Diameter = 28 cm  
 Radius = 14 cm  
 Circumference =  $2\pi r = 2 \times \frac{22}{7} \times 14 = 88 \text{ cm}$

$$\text{Revolutions taken} = \frac{35200}{88} = 400$$

**E** Perimeter of rectangle = Circumference of circle

$$2(l + b), 2(18 + 15) = 2(33)$$

$$66 \text{ cm} = 2\pi r, \frac{66 \times 7}{44} = r \quad r = 10.5 \text{ cm}$$

**F** Circumference of circle = Perimeter of square

$$\frac{2 \times 22}{7} \times 42 = 4 \times \text{side} \quad \frac{2 \times 22 \times 6}{4} = \text{side} \quad 66 \text{ cm} = \text{side}$$

**G** Let the radius of circles be  $3r$  and  $4r$

$$\therefore \text{Circumference} = 2\pi r, 2 \times \pi \times (3r) \quad 6\pi r$$

$$\text{Circumference of 2nd circle} = 8\pi r$$

$$\text{Ratio} = \frac{6\pi r}{8\pi r} \quad 3 : 4$$

**A** 1.  $HG = 93 + 7 + 7 = 107 \text{ m}$

$$HG = EH = 107 \text{ m}$$

$$FG = 79 + 7 + 7 = 93 \text{ cm}$$

$$\text{Area of path} = \text{Area of } EFGH - \text{Area of } ABCD$$

$$= (107 \times 93) - (93 \times 79) = 9951 - 7347 = 2604 \text{ m}^2$$

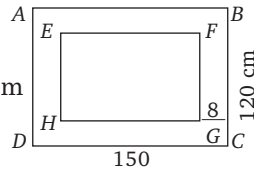
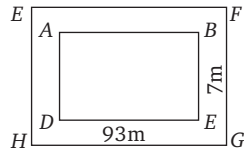
2.  $AB = DC - 8 - 8$

$$= 150 - 8 - 8$$

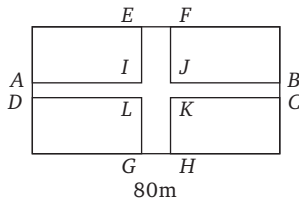
$$= 134 \text{ cm} \quad FG = 120 - 8 - 8 = 104 \text{ cm}$$

$$\text{Area of painted part} = \text{Area of } EFGH$$

$$= 134 \times 104 = 13936 \text{ cm}^2$$



3.



$$\text{Area of roads} = \text{Area of } ABCD + \text{Area of } EFGH - \text{Area of } IJKL$$

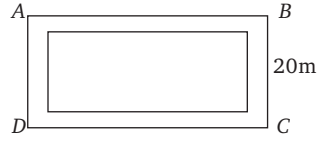
$$= 80 \times 10 + 60 \times 10 - 10 \times 10 = 800 + 600 - 100 = 1400 - 100$$

$$= 1300 \text{ cm}^2$$

$$\text{Cost of grawling } 1 \text{ m}^2 = 1.20$$



4. Let  $ABCD$  denotes the rectangular sheet  
 Length of sheet = 30 cm  
 Breadth of sheet = 20 cm



$$\text{Area of sheet} = l \times b = 30 \times 20 = 600 \text{ cm}^2$$

4 cm wide strip is cut all around, rectangular sheet obtain, have

$$\text{Length} = 30 - (4 + 4) = 22$$

$$\text{Breath} = 20 - (4 + 4) = 12$$

$$\text{Area of remaining sheet} = 22 \times 12 = 264 \text{ cm}^2$$

$$\text{Area of strip contact} = 600 - 264 = 336 \text{ cm}^2$$

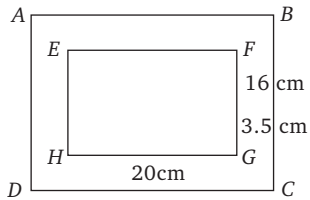
5. (a) Area of Margin

$$= \text{Area of } ABCD -$$

$$\text{Area of } EFGH$$

$$\text{Area of } EFGH = 20 \times 16$$

$$= 320 \text{ cm}^2$$



$$\text{Length of } ABCD = 20 + 3.5 + 3.5 = 27$$

$$\text{Breath of } ABCD = 76 + 3.8 + 3.5 = 23$$

$$\text{Area of } ABCD = 72 \times 23 = 621 \text{ cm}^2$$

$$\text{Area of margin} = 621 - 320 = 301 \text{ cm}^2$$

- (b) Cost of 1 sq cm cardboard = ₹1.50

$$\text{Cost of } 621 \text{ cm}^2 = 621 \times ₹1.50 = ₹931.50$$

- A**
1. Area of parallelogram =  $b \times h = 8 \times 3 = 24 \text{ cm}^2 \text{ cm}^3$
  2. Area of parallelogram =  $b \times h = 2.8 \times 5 = 14.0 \text{ cm}^2$
  3. Area of parallelogram =  $b \times h = 6.5 \times 4.8 = 31.2 \text{ cm}^2$

- B**
1. Area of parallelogram =  $b \times h$

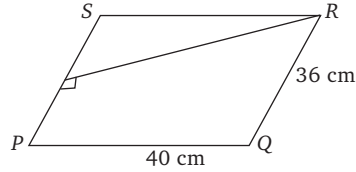
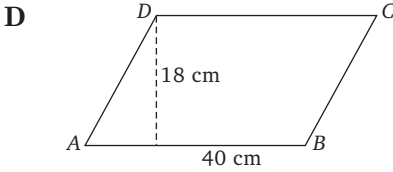
$$856 = b \times 0.4 \left( 40 \text{cm} = \frac{40}{100} \right) m$$

$$\frac{856}{0.4} = b, 2140 \text{ m} = b$$

$$2. \text{Base} = \frac{\text{Area}}{\text{Altitude}} = \frac{545 \times 10}{015} = 1090 \text{ cm}$$

$$3. \frac{\text{Area of parallelogram}}{\text{Altitude}} = \text{base}, \frac{348}{30} = b \quad 11.6 \text{ cm} = b$$

C  $\text{Base} = \frac{\text{Area}}{\text{Altitude}} = \frac{71.25}{7.5} = 9.5$



Area of  $ABCD = \text{Area of } PQRS$  (Given)

$$40 \times 18 = 36 \times \text{Altitude}$$

$$\frac{40 \times 18}{26} = \text{Altitudes}$$

Altitude of  $PQRS = 20 \text{ cm}$

E 1. Area of  $ABCD = b \times h$

$$2.4 = 2 \times h, \frac{2.4}{2} = h, DE = 1.2 \text{ m}$$

2.  $(AD)^2 = (DE)^2 + (AE)^2$

$$(AD)^2 - (DE)^2 = (AE)^2$$

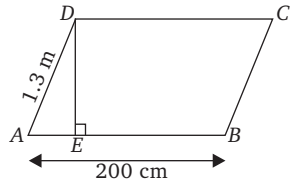
$$(1.3)^2 - (1.2)^2 = (AE)^2$$

$$1.69 - 1.44 = (AE)^2$$

$$0.25 = (AE)^2$$

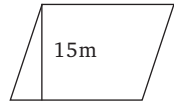
$$0.5 \text{ m} = AE$$

$$EB = AB - AE = 2 - 0.5 = 1.5 \text{ m} = 150 \text{ cm}$$



F Area of parallelogram =  $b \times h$

$$\frac{420}{15} = b, 28 \text{ m} = b$$



G Area of  $ABCD = b \times h = 30 \times 15 = 450 \text{ cm}^2$

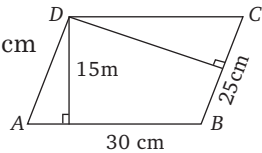
$$450 = 25 \times DF, \frac{450}{25} = DF = 18 \text{ cm}$$

H Area of square = Area of parallelogram

$$40 \times 40 = 20 \times b$$

$$\frac{40 \times 40}{20} = b$$

$$80 \text{ m} = \text{base}$$



A 1. Area of triangle =  $\frac{1}{2} \times b \times h = \frac{1}{2} \times 18 \times 10 = 90 \text{ cm}^2$

$$2. \text{ Area of triangle} = \frac{1}{2} \times b \times h = \frac{1}{2} \times 12.5 \times 8 = 50 \text{ cm}^2$$

$$3. \text{ Area of triangle} = \frac{1}{2} \times b \times h = \frac{1}{2} \times 10 \times 10 = 50 \text{ cm}^2$$

**B**

$$(AB)^2 = (AD)^2 + (DB)^2, (AB)^2 - (DB)^2 = (AD)^2$$

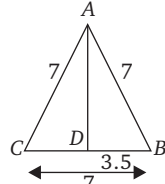
$$(7)^2 - (3.5)^2 = (AD)^2,$$

$$49 - 12.75 = AD^2$$

$$36.75 \text{ cm} = AD^2, \sqrt{36.75} = AD$$

$$6.06 \text{ cm} = AD$$

$$\text{Area of } \triangle ABC = \frac{1}{2} \times CB \times AD = \frac{1}{2} \times 7 \times 6.06 = 21.21 \text{ cm}^2$$

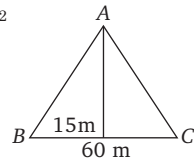


**C**

$$\text{Area of } \triangle ABC = \frac{1}{2} \times b \times h = \frac{1}{2} \times 60 \times 15 = 450 \text{ m}^2$$

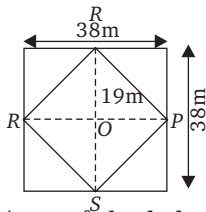
$$\text{Cost of painting } 1 \text{ m}^2 = 1.50$$

$$\text{Cost of printing } 450 \text{ m}^2 = 450 \times 1.50 = ₹675$$



**D** Do it yourself

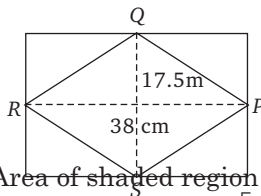
**E** 1.



Area of shaded region = Area of square - Area of 2 triangle

$$= 38 \times 38 - 2 \left[ \frac{1}{2} \times 38 \times 19 \right] = 1444 - 722 = 722 \text{ cm}^2$$

2.



Area of shaded region = Area of rectangle - Area of 2

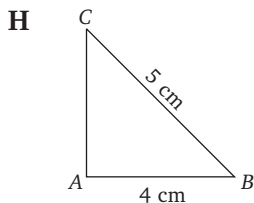
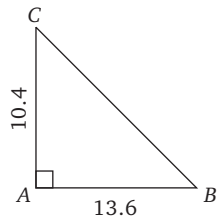
$$\text{triangle} = 38 \times 35 - 2 \left[ \frac{1}{2} \times 38 \times 17.5 \right] = 1330 - 665 = 665 \text{ cm}^2$$

**F** Area of square = Area of triangle

$$60 \times 60 = \frac{1}{2} \times 90 \times b, \frac{60 \times 60}{45} = \text{base}$$

80 m = side of triangle

**G** Area of  $ABC = \frac{1}{2} \times \text{base} \times \text{height}$   
 $= \frac{1}{2} \times 13.6 \times 10.4 = 70.72$



Let the third side be  $x$   
 Perimeter of triangle = Sum of all sides  
 $12 = x + 5 + 4, 12 - 9 = x, 3 \text{ cm} = x$   
 Area of triangle =  $\frac{1}{2} \times b \times h$   
 $= \frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2$

**A** 1.  $r = 21 \text{ cm}, \text{Area} = \pi r^2 = \frac{22}{7} \times 21 \times 21 = 1386 \text{ cm}^2$

2.  $\text{Area} = \pi r^2 = \frac{22}{7} \times 8.4 \times 8.4 = 221.76 \text{ cm}^2$

3.  $\text{Area} = \pi r^2 = \frac{22}{7} \times 42 \times 42 = 5544 \text{ cm}^2$

**B** 1. Diameter = 56 cm

Radius = 28 cm

$\text{Area} = \frac{22}{7} \times 28 \times 28 = 2464 \text{ cm}^2$

2. Diameter = 1.4

Radius = 0.7

$\text{Area} = \frac{22}{7} \times 0.7 \times 0.7 = 1.54 \text{ cm}^2$

3. Diameter = 65

Radius = 32.5

$\text{Area} = \frac{22}{7} \times 32.5 \times 32.5 = 3319.64 \text{ m}^2$

**C** Circumference =  $2\pi r$

$88 = \frac{2 \times 22}{7} \times r = \frac{88 \times 7}{2 \times 22} = r$

$\text{Area} = \frac{22}{7} \times 14 \times 14 = 616 \text{ m}^2$

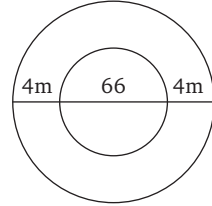
D Area =  $\pi r^2$ ,  $616 = \frac{22}{7} \times r^2$ ,  $\frac{616 \times 7}{22} = r^2$

$196 = r^2$ ,  $r = 14$  m

E Area of path = Area of outer circle - Area of inner circle  
 $= \frac{22}{7} \times 37 \times 37 - \frac{22}{7} \times 33 \times 33 = 4302.5 - 3422.5 = 880.0$

Cost of turfing =  $880 \times 2.50 = ₹2200$

Diameter of outer areas = 74,  $r = \frac{74}{2} = 37$



F Area =  $\frac{22}{7} \times 21 \times 21 = 1386 \text{ m}^2$

Circumference =  $2 \times \frac{22}{7} \times 21 = 132$  cm

G Area of remaining portion = Area of rectangle - Area of circle  
 $= 90 \times 32 - \frac{22}{7} \times 14 \times 14 = 2880 - 616 = 2264 \text{ m}^2$

Cost of turfing  $2264 \text{ m}^2$  area =  $2264 \times 2.50 = ₹5660$

A 1. (c) 2. (b) 3. (b) 4. (a)

B Area =  $l \times b = 42 \times 25 = 1050 \text{ m}^2$

C 1. Area = Side  $\times$  side =  $4 \times 4 = 16 \text{ cm}^2$

2. Area =  $6 \times 6 = 36 \text{ cm}^2$

3. Area =  $8 \times 8 = 64 \text{ cm}^2$

D Perimeter =  $2(l + b) = 2(3 + 2) = 10$  cm

Area =  $l \times b = 3 \times 2 = 6 \text{ cm}^2$

E length =  $45 \text{ m } 50 \text{ cm} = 45 + \frac{50}{100} \text{ m} = 45 + 0.5 \text{ m} = 45.5 \text{ m}$

Area =  $l \times b$ ,  $1547 = 45.5 \times b$ ,  $\frac{1547}{45.5} = b$

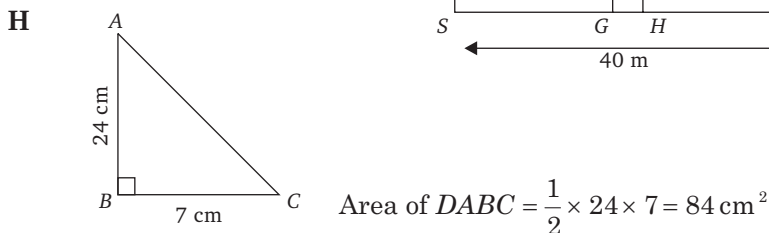
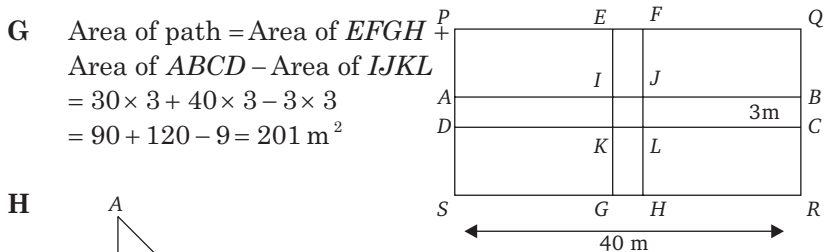
$34 \text{ m} = \text{breadth}$

F Area =  $l \times b$ ,  $630 = l \times 15$ ,  $\frac{630}{15} = l$

$42 \text{ m} = \text{length}$

Perimeter =  $2(l + b)$

$2(42 + 15) = 2 \times 57 = 114$



- I**
- Area of shaded region = Area of outer circle - Area of inner circle
 
$$= \frac{22}{7} \times 4 \times 4 - \frac{22}{7} \times 3 \times 3 = 50.28 - 28.28$$

$$= 22 \text{ cm}^2$$
  - Area of shaded region = Area of square - Area of circle
 
$$= 70 \times 70 - \frac{22}{7} \times 35 \times 35 = 4900 - 3850 = 1050 \text{ cm}^2$$

## Chapter 14 Data Handling

- A** Ascending order - 128, 139, 140, 142, 143, 146, 148, 149, 152, 154
- 154 cm
  - 128 cm
  - Mean height
 
$$= \frac{128 + 139 + 140 + 142 + 143 + 146 + 148 + 149 + 152 + 159}{10}$$

$$= \frac{1441}{10} = 144.1 \text{ cm}$$
- B** Mean =  $\frac{57 + 75 + 40 + 34 + 45 + 60 + 45 + 44}{8} = 50$

C

Marks	No. of students	Marks x no. of students	
5	1	5	
15	10	150	Mean = $\frac{2530}{81}$
25	30	750	= 31.23
35	20	700	
45	15	675	
50	5	250	
Total =	81	= 2530	

D Odd Number = 1, 3, 5, 7, 9, 11, 13, 15, 17, 19

$$\text{Mean} = \frac{1+3+5+7+9+11+13+15+17+19}{10} = 10$$

E Even No. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

$$\frac{2+4+6+8+10+12+14+16+18+20}{10} = \frac{110}{10} = 11$$

F First seven whole No. =  $\frac{0+1+2+3+4+5+6}{7} = \frac{21}{7} = 3$

G First four prime No.  $\frac{2+3+5+7}{4} = \frac{17}{4} = 4.25$

H

Expenses in Rupees	No. of Employees	Expenses X no. of Employees
10	28	280
12	16	192
14	10	140
16	40	640
18	6	108
	100	1360

$$\text{Mean} = \frac{1360}{100} = 13.60$$

Median = 19

2. Ascending order = 11, 12, 17, 19, 20, 21, 25, 27, 28

Median = 20

3. Ascending order 29, 29, 31, 32, 35, 35, 35, 36, 37, 38, 38, 41, 43,

Median = 35

**B** 1. First 15 natural numbers

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Median = 8

**C** First 10 composite number are : 4, 6, 8, 9, 10, 12, 14, 15, 16, 18

$$\text{Median} = \frac{10 + 12}{2} = 11$$

**D** 1. 11                      2. 4

Do it yourself

Chapter Check-up

**A**

Height (cm)	No. of students	Tally Marks
42	1	
61	1	
63	1	
67	1	
69	1	
75	1	
80	4	
81	1	
83	1	
85	2	
92	1	

**B** Do it yourself

**C** Do it yourself

**D** Mean =  $\frac{131 + 127 + 125 + 130 + 133 + 129 + 128}{7} = 129$



E

Pocket Money	No. of students	Pocket money × No. of student
10	4	40
20	8	160
30	12	360
40	6	240
	30	800

1. Mean =  $\frac{800}{30} = 26.6$       2. Mode = 30  
 3. Median = 30

## Chapter 15 Probability

- A** 1. 0      2.  $\frac{1}{2}$       3.  $\frac{1}{4}$       4. 1  
**B** 1. 11      2. (a)  $\frac{1}{11}$       (b)  $\frac{1}{11}$       (c)  $\frac{2}{11}$       (d)  $\frac{2}{11}$   
 (e)  $\frac{4}{11}$       (f)  $\frac{7}{11}$       (g) 0      (h) 1  
**C** 1.  $\frac{1}{6}$       2.  $\frac{1}{3}$       3.  $\frac{1}{2}$       4. 0  
**D** 1.  $\frac{3}{14}$       2.  $\frac{5}{14}$       3.  $\frac{2}{7}$       4.  $\frac{1}{7}$   
 5.  $\frac{11}{14}$       6.  $\frac{9}{14}$   
**E** 1.  $\frac{1}{4}$       2.  $\frac{1}{2}$   
**F** 1.  $\frac{1}{3}$       2.  $\frac{1}{5}$       3.  $\frac{1}{7}$       4.  $\frac{1}{4}$       5.  $\frac{1}{20}$   
**G**  $\frac{1}{5}$

### Model Test Paper - I

- A** 1. (a)      2. (b)      3. (d)      4. (a)  
 5. (b)      6. (a)  
**B** 1.  $H^2 = P^2 + B^2$ ,  $B^2 = H^2 - P^2 = (25)^2 - (24)^2 = 625 - 576 = 49$   
 Base = 7 cm  
 2.  $H^2 - B^2 = P^2$ ,  $(1765)^2 - (84)^2 = P^2$   
 $3115225 - 7056 = P^2$ ,  $3108169 = P^2$ ,  $1763 \text{ cm} = P$   
 3.  $(12)^2 + (9)^2 = x^2$ ,  $144 + 81 = x^2$ ,  $225 = x^2$ ,  $15 \text{ cm} = x$   
 4.  $(41)^2 - (40)^2 = x^2$ ,  $1681 - 1000 = x^2$ ,  $81 = x^2$ ,  $9 \text{ cm} = x$   
**C**  $90^\circ - 75^\circ = 15$

**D** Total No. of Teachers = 56

Lady teachers = 42

Male teachers =  $56 - 42 = 14$

1. Ratio of male teachers to lady teachers =  $\frac{14}{42} = \frac{1}{3} = 1 : 3$

2. Ratio of lady teacher to male teacher = 3 : 1

3. Ratio of male teacher to total no. of teachers  
=  $\frac{14}{50} = \frac{1}{4} = 1 : 4$

**E** Do it yourself

**F** 1.  $5 - x = 3$ ,  $5 - 3 = x$ ,  $2 = x$

2.  $x - 16 = 10$ ,  $x = 10 + 16$ ,  $x = 26$

3.  $11x + 13 = -20$ ,  $11x = -20 - 13$ ,  $11x = -33$ ,  $x = -3$

4.  $3x - x = 8$ ,  $2x = 8$ ,  $x = 4$

5.  $x + (x + 2) = (x + 4) + 31$

$2x - x = 31 + 4 - 2$ ,  $x = 31 + 2$ ,  $x = 33$

6.  $x + 2x = 9$ ,  $3x = 9$ ,  $x = 3$

**G** 1.  $21(x + y)$       2.  $8x = (p - q)$       3.  $(75x + 44y)g$

**H** 1.  $9^x = 729$ ,  $9^x = 9^3$ ,  $x = 3$

2.  $(-2)^x = (-128)$ ,  $(-2)^x = (-2)^7$ ,  $x = 7$

3.  $(-12)^x = 20736$ ,  $(12)^x = (-12)^4$ ,  $x = 4$

4.  $(-10)^x = 1000000$ ,  $(-10)^x = (-10)^6$ ,  $x = 6$

5.  $2^x = 1024$ ,  $2^x = 2^{10}$ ,  $x = 10$

6.  $\left(\frac{6}{7}\right)^x = \frac{7776}{16807}$ ,  $\left(\frac{6}{7}\right)^x = \left(\frac{6}{7}\right)^5$ ,  $x = 5$

**I** 1.  $\left(\frac{-3}{7}\right)^9$       2.  $(18)^{10}$       3.  $(-1)^{25}$       4.  $(-4)^{17}$

5.  $\left(\frac{2}{3}\right)^3$       6.  $\left(\frac{1}{2}\right)^6$

**J** 1.  $\frac{445}{250} \times \frac{37}{21} \times \frac{125}{11} \times \frac{3}{5} \times -5 = \frac{-21}{2} = -10\frac{1}{2}$

2.  $\frac{-3}{19} \times \frac{15}{61} \times 0 \times \frac{18}{31} \times \frac{9}{41} = 0$       3.  $\frac{-9}{10} \times \frac{-5}{3} \times \frac{2}{3} = 1$

4.  $2\frac{1}{3} \times 24\frac{6}{7} \times 18\frac{1}{3} \Rightarrow \frac{7}{3} \times \frac{174}{7} \times \frac{55}{3} = 1063\frac{1}{3}$

**K** Do it yourself

L 1.  $\frac{-1683}{33} = -51$

2.  $\frac{-9028}{-25} = 2257$

3.  $\frac{5050}{-25} = -202$

4.  $\frac{-1248}{-52} = 24$

5.  $\frac{-48}{6} = -8$

6.  $\frac{88}{-8} - 11 = -11$

### Model Test Paper 2

A 1. (a) 2. (b) 3. (a) 4. (c) 5. (a)

B 1. 11 2. (a) 1/11 (b) 1/11 (c) 2/11 (d) 2/11 (e) 4/11  
(f) 7/11 (g) 0 (h) 1

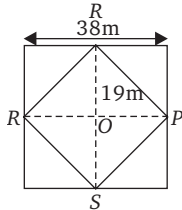
C Do it yourself

D 1. Area of parallelogram =  $D \times l \times h = 8 \times 3 = 24 \text{ cm}^2$

2.  $l \times h = 2.8 \times 5 = 14.0 \text{ cm}^2$

3.  $l \times h, 6.5 \times 4.8 = 31.2 \text{ m}^2$

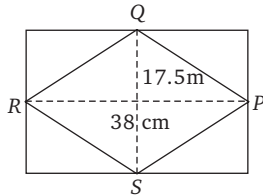
E 1.



Area of shaded region = Area of square - 2 Area of triangle

$$= 38 \times 38 - 2 \left[ \frac{1}{2} \times 30 \times 19 \right] = 1444 - 722 = 722 \text{ cm}^2$$

2.



Area of shaded region = Area of rectangle - 2 Area of

$$\text{triangle} = 38 \times 85 - 2 \left[ \frac{1}{2} \times 19.5 \times 38 \right] = 1330 - 665 = 665 \text{ cm}^2$$

F Do it yourself

G In  $\triangle RPQ$  and  $\triangle QSR$

$PQ = SR$  (Given)

$PR = QS$  (Given)

$QR = QR$  (Common)

$\therefore \triangle RPQ \cong \triangle QSR$

(By SSS Criteria)

**H** In  $\triangle ABD$  and  $\triangle ACD$

$$AB = AC \text{ (given)}$$

$$\angle ADB = \angle ACD \quad (= 90^\circ)$$

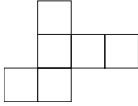
$$\therefore \angle B = \angle C \quad \text{(By CPCT)}$$

$$AD = AD \text{ (Common)}$$

$$\therefore \triangle ABD \cong \triangle ADC$$

**I** 1. 2      2. 5      3. 1      4. 5, 8

**J**



**K**

