Answer Sheet

Chapter-1 knowing Our Numbers

Exercise = 1.1

1.   (i) $16+(-9)=16-9=7$ (ii) $(-17)+10=-17+10=-7$

      (iii) $(-8)+(-24)=(-8)+(-24)=-32$ (iv) $(-33)+48=48-33=15$

      (v) $54+(-27)=54-27=27$ (vi) $(-49)+-37=-86$

2.   (i) $(-42)-28=-70$ (ii) $42-36=6$

      (iii) $(-53)-(-37)=-53+37=-16$ (iv) $(-34)-(-66)=-34+66=32$

      (v) $0-318=0$ (vi) $(-240)-(-153)=-240+153=-87$

3.   (i) > (ii) > (iii) < (iv) < (v) > (vi) > (vii) > (viii) >

4.   (i) $-12<0<12<21$ (ii) $-5<-4<2<3$

      (iii) $-13<-7<-1<3$ (iv) $-15<-9<-5<5$

      (v) $-10<0<6<10$ (vi) $-9<-4<-3<3$

5.   (i) -12 (ii) 6 (iii) 1 (iv) -3 (v) -1 (vi) 1

6.   (i) $-(-9)=9$ (ii) $-(+9)=-9$ (iii) $+(-9)=-9$

      (iv) $-|-9|=-9$ (v) $|-12|=12$ (vi) $|20|=20$

      (vii) $-|4|=-4$ (viii) $|6-2|=4$

7.   (i) -7 (ii) -10 (iii) 0

8.   (i) -4 (Commutative property of addition)   (ii) 0 (Additive Identity)

      (iii) 0 Additive Identity)   (iv) -5 (Associativity of Addition)

      (v) -50 (Associativity of Addition)   (vi) 0 (Additive identity)

      (vii) 0 (Additive inverse)   (viii) 5 (Additive inverse) (-5)

9. $-23+x=-9$, $x=-9+23$, $x=+14$

10.   The sum of two integers $=65$

      If one integers $=-35$

      The other integers $=x+(-35)=65$

         $x=65+35$, $x=100$

11. $36-(-64)-(-64)-36$

      $=(36+64)-(-64-36)=100+100=200$

12. $(25)+(-5)+(-10)+15+10$

      $=25-5-10+15+10,=20+5+10,=25+10=35$

13. and **14.** Do your self

Exercise = 1.2

1.   (i) $(-12)\times(-40)=480$ (ii) $(-161)\times(-1)=161$

      (iii) $(-10)\times5\times(-2)=100$ (iv) $4\times(-4)\times0\times-9=0$

      (v) $100\times(-1)\times(-3)=300$ (vi) $(-3)\times(-2)\times(-5)\times(-2)=60$

2.   (i) $26\times(-48)+(-48)\times(-36)$

        $=-48[26+(-36)]=-48\times(-10)=480$

(**1**)

(ii) $8 \times 53 \times (-125) = [8 \times (-125)] \times 53$

$\qquad\qquad = -1000 \times 53 = -53,000$

(iii) $(-17) \times (-29) = -17 \times (-30 - 1)$

$\qquad\qquad = (-510) - (-17) = 493$

(iv) $(-41) \times 102 = (-41) \times (100 + 2)$

$\qquad\qquad = -4100 - 82 = -4182$

(v) $-1 \times [50 - 2] = (-50) + 2 = -48$

3. (i) -2 (Commutative property for multiplication)

(ii) -5 (Associative property of multiplication)

(iii) -4 (Distributive property for multiplication)

(iv) -4 (Commutative property of multiplication)

(v) 0 (Property of zero for multiplication)

(vi) -23 (Commutative property of multiplication)

4. (i) $10 \times [8 - (-3)] = 10 \times 8 - 10 \times (-3)$

$\qquad = 10 \times 8 - 10 \times (-3) = 10 \times 8 - 10 \times (-3)$

$\qquad = 80 + 30 = 80 + 30, 110 = 110$

(ii) $(-25) \times [(-9 - (-4) = (-25) \times (-9) - (-25) \times (-4)$

$\qquad (-25) \times (-9) - (-25) \times (-4) = (-25) \times (-9) - (-25) \times (-4)$

$\qquad\qquad 225 - 100 = 225 - 100$

$\qquad\qquad\qquad 125 = 125$

(iii) $(-40) \times [43 + (-3)] = [(-40) \times 43] + [(-40 \times (3)]$

$\qquad (-40 \times 43) + (-40 + (-3) = [(-40) \times 43] + (-40) \times (-3)]$

$\qquad\qquad -1720 + 120 = -1720 + 120$

$\qquad\qquad\qquad 1600 = 1600$

5. (i) +ve   (ii) −ve

6. (i) $5 \times [(-4) - x] = 5 \times (-4) - 5 \times 10$

$\qquad 5 \times (-4) - 5 \times (-x) = 5 \times (-4) - 5 \times 10$

$\qquad 5 \times (-4) - 5 \times (-x) = (-20) - 50$

$\qquad\qquad -20 - 5 \times (x) = 70$

So, $\qquad -5 \times (-x) = 50$

$\qquad\qquad\qquad -x = \dfrac{50}{-5} = -10$

$\qquad\qquad\qquad -x = -10$

(ii) $2 \times (3 + x) = 2 \times 3 + 6 \times 2$

$\qquad (2 \times 3) + (2 \times x) = (2 \times 3) + (6 \times 2)$

$\qquad\qquad 6 + 2 \times x = 6 + 12$

So, $\qquad 2x = 12$

$\qquad\qquad\qquad x = \dfrac{12}{2}$

$\qquad\qquad\qquad x = \dfrac{12}{6}$

$\qquad\qquad\qquad x = 6$

7.   (i) 22, (ii) -37, (iii) 0, (iv) 11

8.   Do it yourself.

9.   The company sells white cement bags = 3000

   (i)   The company earns profit of white cement bags = $3,000 \times ₹\, 8$

$$= ₹\, 24,000$$

   The company sold grey cement bags = 5,000

   The company earns loss on gray cement bags = $5,000 \times 5$

$$= ₹\, 25,000$$

   So, $₹\, 24,000 < ₹\, 25,000$

   So, $₹\, 25,000 - ₹\, 24,000 = ₹\, 1,000$

   Thus, the loss of company $₹\, 1,000$

   (ii) $6,400 \times 5 = ₹\, 32,000$ profit $= \dfrac{32,000}{8} = 4,000$

   Thus, the number of white cement bags is 4,000.

Exercise = 1.3

1.   (i) $(-30) \div 10$ (ii) $50 \div -5 = -10$

   (iii) $(-36) \div (-9) = 4$ (iv) $13 \div [(-2) + 1], 13 \div 1 = 13$

   (v) $(-31) \div (-31) + (-11)] = (-31) \div (-31) = 0$

   (vi) $[(-6) + 5] \div [(-2) + 1] = -1 \div -1 = 0$

2.   (i) $235 \div (-1) = -235$ (ii) $-73 \div -1 = 73$ (iii)   0

   (iv) -1 (v)   68   (vi)   7

3.   (i) False   (ii) False   (iii) True   (iv) False   (v) True   (vi) False

4.   (i) $a = 12, b = -4, c = 2$

$$a \div (b + c) \neq (a \div b) + (a \div c)$$
$$12 \div (-4 + 2) \neq (12 \div (-4) + 12 \,(12 \div 2)$$
$$12 \div (-2) \neq -3 + 6$$
$$-6 \neq 3$$

   (ii) $a \div (b + c) \neq (a \div b) + (a \div c)$

$$(-10) \div (1 + 1) \neq [(-10) \div 1] + [(-10) \div 1]$$
$$(-10) \div 2 \neq (-10 \div 1) + (-10 \div 1)$$
$$-5 = -10$$

5.   (i) $6 \div (-2) = (-3)$ (ii) $15 \div (-5) = -3$ (iii) $18 \div (-6) = -3$

   (iv) $12 \div (4) = -3$ (v) $21 \div (-7) = -3$

Exercise = 1.4

1.   (i) $3 \times 4 + 14 \div 2$

$$= 3 \times 4 + 7 = 12 + 7 = 19$$

   (ii) $14 - 10 \div 2 + 6 \times 3$

$$= 14 - 5 + 6 \times 3 = 14 - 5 + 6 \times 3$$
$$= 14 - 15 + 18 = 9 + 18 = 27$$

(iii) $23 + 27 \div (4 + 5) - 5 \times 6$

$= 23 + 27 \div 9 - 5 \times 6 = 23 + 3 - 5 \times 6$

$= 23 + 3 - 30 = 26 - 30 = -4$

(iv) $(20 - 2) \div (5 - 7)$

$= 18 \div -2 = -9$

(v), (vi), (vii) and (viii) similar as (i) to (iv). So, do your self.

2. (i) $12 - [7 - \{16 - (18 - \overline{6 + 3 - 1})\}]$

$= 12 - [7 - \{16 - (18 - 8)\}] = 12 - [7 - \{16 - 10\}]$

$= 12 - [7 - 6], = 12 - 1 = 11$

(ii) $75 - \{35 \times 2 - (14 \times 4 + 6)\}, 75 - \{35 \times 2 - 62\}$

$= 75 - \{70 - 62\}, 75 - 8 = 67$

(iii) $15 + 3 \times 3 - [14 - 2 - 2\{9 - 7 - \overline{9 - 4}\}]$

$= 15 + 3 \times 3 - [14 - 2 - \{9 - 7 - 5\}]$

$= 15 + 3 \times 3 - [14 - 2 - \{9 - 2\}]$

$= 15 + 3 \times 3 - [14 - 2 - 7] = 15 + 3 \times 3 - [14 - 9]$

$= 15 + 3 \times 3 - 5 = 15 + 9 - 5 = 15 + 4 = 19$

(iv) $12 + 5 - [9 - \{6 \div 2 - (6 - 12 \div 3) \div 2\}] - 5$

$= 12 + 5 - [9 - \{6 \div 2 - (6 - 4) \div 2\}] - 5$

$= 12 + 5 - [9 - \{6 \div 2 - 2 \div 2\}] - 5$

$= 12 + 5[9 - \{3 - 1\}] - 5 = 12 + 5 - [9 - 2] - 5$

$= 12 + 5 - 7 - 5 = 17 - 12 = 5$

(v), (vi), (vii) and (viii) similar as (i) to (iv) So, do your self.

Objective Type Questions

1. (ii), **2.** (iii), **3.** (iv), **4.** (iv), **5.** (i), **6.** (ii), **7.** (ii), **8.** (i), **9.** (ii), **10.** (ii)

Fill in the blanks

1. Zero, **2.** Commutative, associative, **3.** 0, **4.** Positive, **5.** division

True/False

1. False **2.** True, **3.** True, **4.** False, **5.** True

Chapter Assessment

1. (i) 190, (ii) -11 (iii) -504, (iv) -100 (v) 210 (vi) $+1$ (vii) -2 (viii) 5

2. (i) 0 (ii) -2 (iii) -10 (iv) 8

3. (i) 12 (ii) -12 (iii) $-\dfrac{1}{10}$ (iv) 9 (v) 3 (vi) 15

4. (i) 1 (ii) $-\dfrac{1}{8}$ (iii) $-\dfrac{1}{10}$ (iv) $\dfrac{1}{12}$

5. (i) -11 (ii) 13 (iii) 22

7. (i) -480 (ii) $-15,600$ (iii) 500 (iv) 0 (v) 3,774 (vi) 1,764

8. (i) $<$ (ii) $=$ (iii) $<$ (iv) $>$ (v) $=$ (vi) $<$

9. 1,660 m   **10.** Integer c by -10 km from A

11. 358

Chapter-2 Fractions

1. (i) $\dfrac{3}{5}$ and $\dfrac{4}{3} = \dfrac{3}{5} < \dfrac{4}{3}$ (ii) $\dfrac{6}{7} < \dfrac{7}{6}$

   (iii) $\dfrac{21}{5} < \dfrac{18}{4}$ (iv) $\dfrac{7}{15} > \dfrac{9}{20}$

2. (i) $\dfrac{5}{14} < \dfrac{8}{21} < \dfrac{4}{7} < \dfrac{2}{3}$ (ii) $\dfrac{13}{24} < \dfrac{7}{10} < \dfrac{3}{4} < \dfrac{7}{8}$

3. (i) $\dfrac{17}{20} > \dfrac{4}{5} > \dfrac{11}{15} > \dfrac{7}{10}$ (ii) $\dfrac{9}{14} > \dfrac{13}{28} > \dfrac{11}{35} > \dfrac{2}{7}$

4. (i) $\dfrac{48}{72} = \dfrac{2}{3}$ (ii) $\dfrac{276}{115} = \dfrac{12}{5}$

   (iii) $\dfrac{72}{336} = \dfrac{3}{14}$ (iv) $\dfrac{18}{81} = \dfrac{2}{9}$

5. (i) $\dfrac{18}{24} , \dfrac{20}{24} , \dfrac{21}{25}$ (ii) $\dfrac{56}{200} , \dfrac{180}{200} , \dfrac{95}{200}$

6. (i) $4 + \dfrac{7}{8} = \dfrac{4}{1} + \dfrac{7}{8} = \dfrac{4 \times 8}{1 \times 8} = \dfrac{32}{8} = \dfrac{32 + 7}{8} = \dfrac{39}{8}$

   (ii) $2\dfrac{2}{3} + 3\dfrac{1}{2} = \dfrac{8}{3} + \dfrac{7}{2} = \dfrac{8 \times 2}{3 \times 2} = \dfrac{16}{6} = \dfrac{7 \times 3}{2 \times 3} = \dfrac{21}{6}$

$$= \dfrac{16 + 21}{6} = \dfrac{37}{6}$$

   (iii) $\dfrac{7}{10} + \dfrac{2}{5} + \dfrac{3}{2} = \dfrac{7 + 4 + 15}{10} = \dfrac{26}{10} = \dfrac{13}{5}$

   (iv) $5 + \dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4} = \dfrac{60 + 6 + 4 + 3}{12} = \dfrac{73}{12}$

7. (i) $\dfrac{3}{8} - \dfrac{1}{8} = \dfrac{3 - 1}{8} = \dfrac{2}{8} = \dfrac{1}{4}$

   (ii) $\dfrac{7}{12} - \dfrac{3}{12} = \dfrac{7 - 3}{12} = \dfrac{4}{12} = \dfrac{1}{3}$

   (iii) $\dfrac{47}{11} - \dfrac{25}{11} = \dfrac{47 - 25}{11} = \dfrac{22}{11} = 2$

   (iv) $7\dfrac{1}{6} - 2\dfrac{3}{42} = \dfrac{43}{6} - \dfrac{87}{42} = \dfrac{301 - 87}{42} = \dfrac{214}{42} = 5\dfrac{2}{21}$

8. (i) $\dfrac{2}{3} + \dfrac{5}{6} - \dfrac{1}{9} = \left(\dfrac{2}{3} + \dfrac{5}{6}\right) - \dfrac{1}{9} = \left(\dfrac{4 + 5}{6}\right) - \dfrac{1}{9} = \dfrac{9}{6} - \dfrac{1}{9}$

$$= \dfrac{27 - 18}{18} = \dfrac{9}{18} = \dfrac{1}{2}$$

   (ii) $8 - 4\dfrac{1}{2} - 2\dfrac{1}{4} = \dfrac{8}{1} - \dfrac{9}{2} - \dfrac{9}{4} = \left(\dfrac{8}{1} - \dfrac{9}{2}\right) - \dfrac{9}{4}$

$$= \left(\dfrac{16 - 9}{2}\right) - \dfrac{9}{4} = \dfrac{7}{2} - \dfrac{9}{4} = \dfrac{14 - 9}{4} = \dfrac{5}{4}$$

(iii) $8\dfrac{5}{6} - 3\dfrac{5}{8} + 1\dfrac{7}{12} = \dfrac{53}{6} - \dfrac{27}{8} + \dfrac{19}{12}$

$= \left(\dfrac{53}{6} - \dfrac{27}{8}\right) + \dfrac{19}{12} = \left(\dfrac{212 - 81}{24}\right) + \dfrac{19}{12} = \dfrac{131}{24} + \dfrac{19}{12}$

$= \dfrac{131}{24} + \dfrac{19}{12} = \dfrac{131 - 38}{24} = \dfrac{93}{24} = 3\dfrac{21}{24}$

9. $17\dfrac{3}{4} - 11\dfrac{2}{3} = \dfrac{71}{4} - \dfrac{35}{3} = \dfrac{213 - 140}{12} = \dfrac{73}{12} = 6\dfrac{1}{12}$

10. The length of a rectangular sheet $= 15\dfrac{3}{4}$cm

The breadth of a rectangular sheet $= 12\dfrac{1}{2}$cm

Thus, the perameteter of a rectangular sheet

$= 2 \text{ (length + breadths)} = 2 \times \left(15\dfrac{3}{4} + 12\dfrac{1}{2}\right)$

$= 2 \times \left(\dfrac{63}{4} + \dfrac{25}{2}\right) = 2 \times \left(\dfrac{63 + 50}{4}\right) = 2 \times \dfrac{113}{4} = \dfrac{1}{2} \times \dfrac{113}{4} = \dfrac{226}{4} = \dfrac{113}{2} = 56\dfrac{1}{2}$

11. Adarsh finished colouring a picture $= \dfrac{7}{12}$

Aadesh finished colouring a picture $= \dfrac{3}{4}$

Worked longer $= \dfrac{3}{4} - \dfrac{7}{12} = \dfrac{9 - 7}{12} = \dfrac{2}{12} = \dfrac{1}{6}$

So, Aadesh finished colouring a picture in longer time $= \dfrac{1}{6}$cm

12. Sanchi studes daily $= 5\dfrac{2}{3}$ hours

She devotes time for Science and Mathematics $= 2\dfrac{4}{5}$ hours

He devotes time for other subject $= 5\dfrac{2}{3} - 2\dfrac{4}{5}$

$= \dfrac{17}{3} - \dfrac{14}{5} = \dfrac{85 - 42}{15} = \dfrac{43}{15} = 2\dfrac{13}{15}$ hours.

13. The cost of mathematics book $= 25\dfrac{3}{4}$

The cost of Science book $= 20\dfrac{1}{2}$

The total cost of both books $= 25\dfrac{3}{4} + 20\dfrac{1}{2}$

$= \dfrac{103}{4} + \dfrac{41}{2} = \dfrac{103 + 82}{4} = \dfrac{185}{4} = 6\dfrac{1}{4}$

14. and **15.** same as 12 question. So, do your self

(6)

Exercise = 2.2

1.   (i) d   (ii) c   (iii) b   (iv) a

2.   Do your self

3.   (i) $\dfrac{7}{3} \times \dfrac{1}{49} = \dfrac{7 \times 1}{3 \times 49} = \dfrac{7}{147} = \dfrac{1}{21}$ (ii) $\dfrac{7}{9} \times \dfrac{15}{28} = \dfrac{7 \times 5}{9 \times 28} = \dfrac{35}{252} = \dfrac{5}{36}$

      (iii) $5\dfrac{3}{6} \times 2\dfrac{2}{11} = \dfrac{33}{6} \times \dfrac{24}{11} = \dfrac{33 \times 24}{6 \times 11} = \dfrac{792}{66} = \dfrac{72}{11} = 6\dfrac{6}{11}$

      (iv) $7\dfrac{1}{9} \times 3\dfrac{2}{16} = \dfrac{64}{9} \times \dfrac{50}{16} = \dfrac{64 \times 50}{9 \times 16} = \dfrac{3,200}{144} = 22\dfrac{32}{144}$

4.   (i) $9 \times \dfrac{3}{7} = \dfrac{9}{1} \times \dfrac{3}{7} = \dfrac{9 \times 3}{1 \times 7} = \dfrac{27}{7} = 3\dfrac{6}{7}$ (ii) $3 \times \dfrac{4}{15} = \dfrac{3}{1} \times \dfrac{4}{15} = \dfrac{3 \times 4}{1 \times 15} = \dfrac{12}{15} = \dfrac{4}{5}$

      (iii) $7 \times \dfrac{2}{5} = \dfrac{7}{1} \times \dfrac{2}{5} = \dfrac{7 \times 2}{1 \times 5} = \dfrac{14}{5} = 2\dfrac{4}{5}$ (iv) $15 \times \dfrac{3}{5} = \dfrac{15}{1} \times \dfrac{3}{5} = \dfrac{15 \times 3}{1 \times 5} = \dfrac{30}{5} = 6$

5.   (i) $7 \times \dfrac{5}{49} = \dfrac{7}{1} \times \dfrac{5}{49} = \dfrac{35}{49} = \dfrac{5}{7}$ (ii) $5 \times \dfrac{1}{45} = \dfrac{5}{1} \times \dfrac{1}{45} = \dfrac{5}{45} = \dfrac{1}{9}$

6.   (i) $\dfrac{1}{10}$ of a rupee

         $1\,\text{rupee} = 100\,\text{paise} = \dfrac{100}{10} = 10\,\text{paise}$

     (ii) $\dfrac{2}{5}$ of a kg

         $1\,\text{kg} = 100\,\text{g} = \dfrac{2}{5} \times 1000 = \dfrac{2,000}{5} = 400\,\text{g}$

     (iii) $\dfrac{1}{10}$ of a meter

         $1\,\text{meter} = 100\,\text{cm}, \dfrac{1}{10} \times 100 = \dfrac{100}{10} = 10\,\text{cm}$

     (iv) $\dfrac{3}{5}$ of a litre

         $= \dfrac{3}{5} \times 1,000\,\text{ml} = \dfrac{3,000}{5} = 600\,\text{ml}.$

     (v) $\dfrac{1}{2}$ of $6\,\text{kg}$

         $1\,\text{kg} = 1,000\,\text{g}, 6\,\text{kg} = 6,000\,\text{g}, \dfrac{1}{2} \times 6,000\,\text{g}$

         $\dfrac{6,000}{2} = 3,000 = 3\,\text{kg}$

     (vi) $\dfrac{4}{5}$ of $700\,\text{ml}$

         $\dfrac{4}{5} \times 700, \dfrac{2,800}{5} = 560\,\text{ml}$

7.   (i) $\dfrac{1}{2} \times 4\dfrac{2}{9} = \dfrac{1}{2} \times \dfrac{38}{9} = \dfrac{38}{18} = \dfrac{19}{9} = 2\dfrac{1}{9}$

(**7**)

(ii) $\dfrac{5}{8} \times 9\dfrac{2}{3} = \dfrac{5}{8} \times \dfrac{29}{3} = \dfrac{5 \times 29}{8 \times 3} = \dfrac{145}{24} = 6\dfrac{1}{24}$

(iii) $1\dfrac{2}{3}$ of $\dfrac{9}{16} = \dfrac{2}{3} \times \dfrac{9}{16} = \dfrac{2 \times 9}{3 \times 16} = \dfrac{\cancel{18}}{\cancel{48}} = \dfrac{\cancel{9}}{\cancel{24}} = \dfrac{3}{8}$

8. $\dfrac{1}{3}$ of 5 is greater

9. (i) $\dfrac{10}{27} \times \dfrac{28}{65} \times \dfrac{39}{56}$

$= \left(\dfrac{10}{27} \times \dfrac{28}{65}\right) \times \dfrac{39}{56} = \left(\dfrac{280}{1,755}\right) \times \dfrac{39}{56} = \left(\dfrac{56}{351} \times \dfrac{39}{56}\right) = \dfrac{2184}{19656} = \dfrac{1}{9}$

(ii) $1\dfrac{4}{7} \times 1\dfrac{13}{22} \times 1\dfrac{1}{15} = \dfrac{11}{7} \times \dfrac{35}{22} \times \dfrac{16}{15}$

$= \left(\dfrac{11}{7} \times \dfrac{35}{22}\right) \times \dfrac{16}{15} = \dfrac{385}{154} \times \dfrac{16}{15} = \dfrac{6160}{2310} = \dfrac{616}{231} = 2\dfrac{154}{231}$

(iii) $2\dfrac{2}{17} \times 7\dfrac{2}{9} \times 1\dfrac{33}{52}$

$= \dfrac{36}{17} \times \dfrac{65}{9} \times \dfrac{85}{52} = \left(\dfrac{36}{17} \times \dfrac{65}{9}\right) \times \dfrac{85}{52} = \dfrac{2340}{63} \times \dfrac{85}{52} = \dfrac{1,98,900}{3,276}$

$= \dfrac{\cancel{49,725}}{\cancel{819}} = \dfrac{\cancel{16,575}}{\cancel{273}} = \dfrac{5,525}{91} = \dfrac{425}{13} = 32\dfrac{9}{13}$

10. Suman can walk in an hour $= 2\dfrac{2}{5}$ km

He will cover distance in $3\dfrac{1}{3}$ hour

$= 2\dfrac{2}{5} \times 3\dfrac{1}{3} = \dfrac{\cancel{12}^4}{\cancel{5}} \times \dfrac{\cancel{10}^2}{\cancel{3}} = 4 \times 2 = 8$ km

11. Sharik made his shots at basket ball practice $= \dfrac{3}{4}$ of his shots

Amrit made the number of shots Sharik made $= \dfrac{2}{5}$ of the number

The fraction of shots did Amrit make $= \dfrac{3}{4} \times \dfrac{2}{5} = \dfrac{3 \times 2}{4 \times 5} = \dfrac{\cancel{6}^3}{\cancel{20}^{10}} = \dfrac{3}{10}$

12. The a ere of a square $= 4 \times$ side

$= 4 \times 10\dfrac{3}{4} = 4 \times \dfrac{43}{4} = \dfrac{4}{1} \times \dfrac{43}{4} = \dfrac{172}{4} = 43\,\text{m}^2$

13, **14**, **15** and **16** do your self

Exercise = 2.3

1. (i) $\dfrac{5}{8} = \dfrac{8}{5}$ (ii) $\dfrac{10}{11} = \dfrac{11}{10}$ (iii) $1\dfrac{1}{4} = \dfrac{5}{4} = \dfrac{4}{5}$

  (iv) $\dfrac{1}{9} = 9$ (v) $7 = \dfrac{1}{7}$ (vi) $5\dfrac{1}{2} = \dfrac{11}{2} = \dfrac{2}{11}$

2. (i) $9 \div \dfrac{7}{3} = \dfrac{9}{1} \div \dfrac{7}{3} = \dfrac{9}{1} \times \dfrac{3}{7} = \dfrac{27}{7} = 3\dfrac{6}{7}$ (ii) $15 \div \dfrac{3}{4} = \dfrac{15}{1} \div \dfrac{3}{4} = \dfrac{15}{4} \times \dfrac{4}{3} = \dfrac{60}{3} = 20$

(iii) $18 \div \dfrac{6}{7} = \dfrac{18}{1} \div \dfrac{6}{7} = \dfrac{18}{1} \times \dfrac{7}{6} = \dfrac{126}{6} = 21$ (iv) $3 \div 2\dfrac{1}{3} = \dfrac{3}{1} \div \dfrac{7}{3} = \dfrac{3}{1} \times \dfrac{3}{7} = \dfrac{9}{7} = 1\dfrac{2}{7}$

3. (i) $\dfrac{4}{9} \div \dfrac{2}{3} = \dfrac{4}{9} \times \dfrac{3}{2} = \dfrac{12}{18} = \dfrac{2}{3}$ (ii) $\dfrac{3}{7} \div \dfrac{8}{7} = \dfrac{3}{7} \times \dfrac{7}{8} = \dfrac{21}{56} = \dfrac{3}{8}$

(iii) $2\dfrac{1}{3} \div \dfrac{3}{5} = \dfrac{7}{3} \div \dfrac{3}{5} = \dfrac{7}{3} \times \dfrac{5}{3} = \dfrac{35}{9} \, 3\dfrac{8}{9}$ (iv) $3\dfrac{1}{2} \div \dfrac{8}{3} = \dfrac{7}{2} \div \dfrac{8}{3} = \dfrac{7}{2} \times \dfrac{3}{8} = \dfrac{21}{16} = 1\dfrac{5}{16}$

4. $30\dfrac{5}{9} \div 25 = \dfrac{275}{9} \div \dfrac{25}{1} = \dfrac{275}{9} \times \dfrac{21}{25} = \dfrac{275}{225} = \dfrac{11}{9} = 1\dfrac{2}{9}$ m

5. $\dfrac{3}{4} \div 7\dfrac{1}{2} = \dfrac{3}{4} \div \dfrac{15}{2} = \dfrac{3}{4} \times \dfrac{2}{15} = \dfrac{6}{60} = \dfrac{1}{10}$

6. $\dfrac{308}{1} \div 1\dfrac{5}{6} = \dfrac{308}{1} \div \dfrac{11}{6} = \dfrac{308}{1} \times \dfrac{6}{11} = \dfrac{1,848}{11} = 168$

7. The length of rope = 21 m

The length of one piece cuts from the rope = $3\dfrac{1}{2}$ m

She got the all pieces of the rope = $21 \div 3\dfrac{1}{2} = \dfrac{21}{1} \div \dfrac{7}{2} = \dfrac{21}{1} \times \dfrac{2}{7} = \dfrac{42}{7} = 6$ So, She get 6 pieces

8. Sangini has money = ₹ 52

The price of one chocolate = ₹ $5\dfrac{1}{5}$

She car buy chocolate = $\dfrac{52}{1} \div \dfrac{26}{5} = \dfrac{52}{1} \times \dfrac{5}{26} = \dfrac{260}{26}$

$= 10$ chocolate

9. Disha built a tower of blocks = $\dfrac{2}{3}$ meter tall

The blocks were each = $\dfrac{1}{15}$ meter

The blocks did she use = $\dfrac{2}{3} \div \dfrac{1}{15} = \dfrac{2}{3} \times \dfrac{15}{1} = \dfrac{30}{3} = 10$ blocks

10. $3\dfrac{1}{3} \div 5\dfrac{5}{6} = \dfrac{10}{3} \div \dfrac{35}{6} = \dfrac{10}{3} \times \dfrac{6}{35} = \dfrac{60}{105} = \dfrac{4}{7}$

11. Do yourself   **12.** Do yourself

Objective Type Questions

1. (i) **2.** (iv) **3.** (iii) **4.** (iii) **5.** (i) **6.** (iv) **7.** (ii) **8.** (iii)

True/False

1. T **2.** T **3.** F **4.** T **5.** F

Fill in the blanks

1. Proper fraction

2. Whole number, fraction   **3.** non zero   **4.** $\dfrac{6}{7}$ **5.** $\dfrac{1}{2}$

Chapter Assessment

1. (i) 15   (ii) 3   (iii) 7

2. (i) $\dfrac{1}{11} < \dfrac{3}{11} < \dfrac{6}{11} < \dfrac{9}{11}$ (ii) $1\dfrac{2}{5} < 1\dfrac{1}{2} < 2\dfrac{1}{4}$ (iii) $\dfrac{1}{7} < \dfrac{3}{7} < \dfrac{5}{7} < \dfrac{11}{7}$

3. (i) $\dfrac{7}{10} > \dfrac{3}{7} > \dfrac{1}{5}$ (ii) $\dfrac{5}{4} > \dfrac{7}{8} > \dfrac{11}{16}$ (iii) $\dfrac{17}{18} > \dfrac{15}{16} > \dfrac{11}{12}$

4. (i) $1\dfrac{1}{15}$ (ii) $1\dfrac{2}{5}$ (iii) $7\dfrac{7}{10}$

    (iv) $3\dfrac{4}{9}$ (v) $18\dfrac{1}{2}$ (vi) $7\dfrac{1}{5}$

5. Do your self

6. (i) 90 minutes   (ii) 10 months   (iii) 160 m

7. (i) $\dfrac{8}{9}$ (ii) $1\dfrac{1}{6}$ (iii) $4\dfrac{2}{7}$ (iv) $10\dfrac{1}{2}$

8. (i) $-2\dfrac{17}{24}$ (ii) $3\dfrac{39}{40}$ (iii) $11\dfrac{41}{160}$ (iv) $\dfrac{71}{72}$

9. $2\dfrac{7}{6}$ 10. $6\dfrac{1}{12}$ 11. $\dfrac{139}{3}$ cm

12. $\dfrac{2}{5}$, Ritu by $\dfrac{1}{5}$ part   13. (i) 800 (ii) 600   (iii) 1,000

Chapter-3 Decimals

Exercise = 3.1

1. (i) $4 \times 10 + 6 \times 1 + \left(\dfrac{1}{10}\right) \times 4 + \left(\dfrac{1}{1000}\right) \times 3$

    (ii) $2 \times 100 + 3 \times 10 + 1 \times 1 + \left(\dfrac{1}{10}\right) \times 5 + \left(\dfrac{1}{100}\right) \times 3$

    (iii) $3 \times 100 + 5 \times 10 + \left(\dfrac{1}{10}\right) \times 8 + \left(\dfrac{1}{100}\right) \times 6$

    (iv) $4 \times 100 + 2 \times 1 + \left(\dfrac{1}{100}\right) \times 5 + \left(\dfrac{1}{100}\right) \times 3$

    (v) $2 \times 100 + 8 \times 10 + 6 \times 1 + \left(\dfrac{1}{10}\right) \times 4 + \left(\dfrac{1}{100}\right) \times 5$

2. (i) $0 \cdot 6 > 0 \cdot 06$ (ii) $1 \cdot 7 < 11 \cdot 5$ (iii) $1 \cdot 39 > 1 \cdot 34$ (iv) $5 \cdot 05 < 5 \cdot 50$

3. (i) > (ii) < (iii) < (iv) > (v) > (iv) <

4. (i) $0 \cdot 25 = \dfrac{25}{100} = \dfrac{1}{4}$ (ii) $31 \cdot 08 = 31 + \dfrac{8}{100} = 31 + \dfrac{2}{25} = 31\dfrac{2}{25}$

    (iii) $0 \cdot 8 = \dfrac{8}{10} = \dfrac{4}{5}$ (iv) $0 \cdot 225 = \dfrac{225}{1,000} = \dfrac{9}{40}$

    (v) $0 \cdot 0092 = \dfrac{92}{10,000} = \dfrac{23}{2,500}$

5. (i) $\dfrac{3}{25} = \dfrac{3 \times 4}{25 \times 4} = \dfrac{12}{100} = 0 \cdot 12$ 　　　　　　(ii) $\dfrac{13}{125} = \dfrac{13 \times 8}{125 \times 8} = \dfrac{104}{1,000} = 0 \cdot 104$

　　(iii) $\dfrac{5}{8} = \dfrac{5 \times 125}{8 \times 125} = \dfrac{625}{1,000} = 0 \cdot 625$ 　　　　(iv) $7\dfrac{3}{40} = \dfrac{283}{40} = \dfrac{283 \times 25}{40 \times 25} = \dfrac{7,075}{1,000} = 7 \cdot 075$

　　(v) $137\dfrac{13}{625} = \dfrac{85,638}{625} = \dfrac{85,638 \times 16}{625 \times 16} = \dfrac{13,70,208}{10,000} = 137 \cdot 0208$

6. (i) $3 \cdot 003 < 3 \cdot 03 < 3 \cdot 3 < 3 \cdot 303 < 33 \cdot 3$

　　(ii) $0 \cdot 07 < 0 \cdot 7 < 7 \cdot 07 < 7 \cdot 7 < 7 \cdot 77$

7. (i) $7 \cdot 15 \, m$ 　　　　(ii) $5 \cdot 175 \, km$ 　　　　(iii) $5 \cdot 4751$ 　　　　(iv) $171 \cdot 75 \, rupee$

8. (i) $12 \cdot 25 + 15 \cdot 62 + 35 \cdot 55 = 63 \cdot 42$

　　(ii) $326 \cdot 123 + 210 \cdot 6 + 632 \cdot 27 = 1168 \cdot 993$

　　(iii) $720 \cdot 62 + 523 \cdot 690 + 120 \cdot 007 = 1364 \cdot 317$

　　(iv) $607 \cdot 12 + 790 \cdot 657 + 1930 \cdot 425 = 3328 \cdot 202$

9. (i) $9 \cdot 756 - 6 \cdot 28 = 3 \cdot 476$ 　　　　(ii) $48 \cdot 1 - 0 \cdot 37 = 47 \cdot 73$

　　(iii) $108 \cdot 032 - 86 \cdot 8 = 21 \cdot 52$ 　　　　(iv) $100 - 26 \cdot 32 = 73 \cdot 68$

10. $18 \cdot 5 - 6 \cdot 2376 = 12 \cdot 2624$

11. $17 \cdot 443 + 29 \cdot 657 = 47 \cdot 1$, $13 \cdot 687 + 18 \cdot 548 = 32 \cdot 235$

　　So, $47 \cdot 1 - 32 \cdot 235 = 14 \cdot 865$

12. $42 \cdot 3 \, km - 28 \cdot 8 \, km = 13 \cdot 5 \, km$

13. $60 \cdot 1 - 32 \cdot 67 = 27 \cdot 43$

14. Vishal bought apples $= 5 \, kg \, 300 \, g$

　　He bought Mangoes $= 3 \, kg \, 250 \, g$

　　He bought total fruits $= 5 \, kg \, 300 \, g + 3 \, by \, 250 = 8 \, g \, 550 \, g$

　　Vani bought Oranges $= 4 \, kg \, 800 \, g$

　　She bought bananas $= 4 \, kg \, 150 \, g$

　　She bought total fruits $= 4 \, kg \, 800 \, g + 4 \, kg \, 150 \, gm = 8 \, kg \, 950 \, g$

　　Who bought more fruits $= ?$

　　Vishal $= 8 \, kg \, 550 \, g <$ Vani $= 8 \, kg \, 950 \, g$

　　So, $8 \, kg \, 950 - 8 \, kg \, 550 \, g = 400 \, g$

　　Vani bought $400 \, g$ fruits more than Vishal.

15. is similar as **14.** so, do your self.

Exercise = 3.2

1. (i) $5 \cdot 85 \times 10 = 58 \cdot 5$ [shifting the decimal point by one place to the right]

　　(ii) $0 \cdot 56 \times 10 = 5 \cdot 6$ 　　(iii) $0 \cdot 0326 \times 100 = 3 \cdot 26$ 　　(iv) $46 \cdot 964 \times 100 = 4696 \cdot 4$

　　(v) $0 \cdot 006 \times 1000 = 6$ 　　(vi) $0 \cdot 1 \times 1000 = 100$

2. (i) $4 \cdot 5 \times 16$ 　　　　　(ii) $0 \cdot 856 \times 19$ 　　　　　(iii) $29 \cdot 86 \times 53$

```
      1  6
   × 4 . 5
   ───────
      8  0
   6  4  0
   ───────
   7  2 . 0
```

```
   0 . 8  5  6
   ×    1  9
   ───────────
   0  7  7  0  4
   0  8  5  6  0
   ───────────
   1  6 . 2  6  4
```

```
      2 . 9  8  6
      ×    5  3
   ───────────────
      8  9  5  8
   1  4  9  3  0  0
   ───────────────
   1  5  8  2 . 5  8
```

(iv) $0 \cdot 0526 \times 169$

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

(v) $0 \cdot 379 \times 23$

```
    0 . 3  7  9
  ×        2  3
  ─────────────────
    1  1  3  7
    7  5  8  0
  ─────────────────
    8 . 7  1  7
```

(vi) $13 \cdot 76 \times 123$

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

3. (i) $2 \cdot 08 \times 0 \cdot 03$

```
      2 . 0  8
  ×   0 . 0  3
  ────────────────
      6  2  4
  0   0  0  0
  0  0  0  0  0
  ────────────────
  0 . 0  6  2  4
```

(ii) $322 \cdot 9 \times 2 \cdot 24$

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

(iii) $20 \cdot 06 \times 2 \cdot 06$

```
    2  0 . 0  6
  ×      2 . 0  6
  ────────────────
  1  2  0  3  6
  0  0  0  0  0
  4  0  1  2  0  0
  ────────────────
  4 . 1  3  2  3  6
```

(iv) $13 \cdot 01 \times 6 \cdot 02$

```
      1  3 . 0  1
  ×        6 . 0  2
  ────────────────
      2  6  0  2
    0  0  0  0  0
  7  8  0  6  0  0
  ────────────────
  7  8 . 3  2  0  2
```

(v) and (vi) similar as (i) to (iv), So, Do your self.

4. The area of a rectangle = length $\times$ breadth

$$= 6 \cdot 8 \, cm \times 4 \cdot 6 \, cm \quad 31 \cdot 28 \, cm^2$$

5. 1 kg of pure milk contains fat $= 0 \cdot 356 \, kg$

The fat in $12 \cdot 5 \, kg$ of milk $= 12 \cdot 5 \div 0 \cdot 356 = 4 \cdot 45 \, kg$

6. A two wheeler covers a distance in one litre of petrol $= 65 \cdot 4 \, km$

It will cover distance in $8 \cdot 5$ litre petrol $= 8 \cdot 5 \times 65 \cdot 4 \, km = 555 \cdot 9 \, km$

7. The cost of one metre cloth $= ₹ 163 \cdot 30$

The cost of $11 \cdot 75$ metre cloth $= 11 \cdot 75 \times 163 \cdot 30 = ₹ 1918 \cdot 775$

8. A bag contains rice $= 299 \cdot 5 \, kg$

The rice contained in 1,000 such bags $= 299 \cdot 5 \times 1,000 = 2,99,500 \, kg$

9. A taxi driver take charges $= 9 \cdot 80$ per km

He will take charges for a journey of $106 \cdot 5 \, km = 106 \cdot 5 \times ₹ 9 \cdot 80 = ₹ 1043 \cdot 7$

Exercise = 3.3

1. (i) $44 \cdot 28 \div 10 = \dfrac{44 \cdot 28}{10} \quad 4 \cdot 428$ [Shifting decimal point to the left by 1 place]

(ii) $8 \cdot 78 \div 10 = \dfrac{8 \cdot 78}{10} = 0 \cdot 878$

(iii) $0 \cdot 02 \div 100 = \dfrac{0 \cdot 02}{100} = 0 \cdot 0002$ [Shifting decimal point to the left by 2 place]

(iv) $0 \cdot 83 \div 100 = \dfrac{0 \cdot 83}{100} = 0 \cdot 0083$

(v) $587 \cdot 35 \div 100 = \dfrac{587 \cdot 35}{100} = 5 \cdot 8735$

(vi) $20 \cdot 01 \div 1,000 = \dfrac{20 \cdot 01}{1000} = 0 \cdot 02001$ [Shifting decimal point to the left by 3 place]

(vii) $0 \cdot 83 \div 1000 = \dfrac{0 \cdot 83}{1000} = 0 \cdot 00083$

2. (i) $7 \cdot 2 \div 0 \cdot 9 = \dfrac{7 \cdot 2}{0 \cdot 9} = \dfrac{7 \cdot 2 \times 10}{0 \cdot 9 \times 10} = \dfrac{72}{9} = 8$ (ii) $13 \cdot 2 \div 1 \cdot 2 = \dfrac{13 \cdot 2 \times 10}{1 \cdot 2 \times 10} = \dfrac{132}{12} = 11$

   (iii) $2 \cdot 45 \div 0 \cdot 35 = \dfrac{2 \cdot 45 \times 100}{0 \cdot 35 \times 100} = \dfrac{245}{35} = 7$ (iv) $1 \cdot 53 \div 1 \cdot 7 = \dfrac{1 \cdot 53 \times 10}{1 \cdot 7 \times 10} = \dfrac{15 \cdot 3}{17} = 0 \cdot 9$

   (v) $28 \cdot 29 \div 2 \cdot 3 = \dfrac{28 \cdot 29 \times 10}{2 \cdot 3 \times 10} = \dfrac{282 \cdot 9}{23} = 12 \cdot 3$

   (vi) $0 \cdot 8085 \div 0 \cdot 35 = \dfrac{0 \cdot 8085 \times 100}{0 \cdot 35 \times 100} = 2 \cdot 31$

   (vii) $21 \cdot 976 \div 1 \cdot 64 = \dfrac{21 \cdot 976 \times 1000}{1 \cdot 64 \times 1000} = \dfrac{21976}{1640} = 13 \cdot 4$

   (viii) $131 \cdot 58 \div 2 \cdot 15 = \dfrac{131 \cdot 58 \times 100}{2 \cdot 15 \times 100} = \dfrac{13158}{215} = 61 \cdot 2$

3. (i) $10 \cdot 8 \div 12 = \dfrac{10 \cdot 8 \times 100}{12 \times 100} = \dfrac{1080}{1200} = 0 \cdot 9$ (ii) $2 \cdot 25 \div 15 = 0 \cdot 15$

   (iii) $3 \cdot 23 \div 19 = 0 \cdot 17$ (iv) $0 \cdot 567 \div 9 = 0 \cdot 063$

   (v) $2 \cdot 32 \div 16 = 0 \cdot 145$ (vi) $12 \cdot 8 \div 500 = 0 \cdot 0255$

   (vii) $18 \cdot 08 \div 400 = 0 \cdot 0452$

4. The weight total bags of sugar $= 3644 \cdot 5 \, \text{kg}$

   The number of total bags $\quad = 37$

   The weight of each bag $\quad\quad = 3644 \cdot 5 \div 37 = 98 \cdot 5 \, \text{kg}$

5. Mr. Gupta distributed Money equally among NCC cadets for refreshment $= 1840$

   Each cadet receive money $\quad = ₹\,28 \cdot 75$

   The number of total cadets $\quad = ₹\,1840 \div ₹\,28 \cdot 75 = 64$

6. The length of each side of a polygon $= 2 \cdot 9 \, \text{cm}$

   The perimetre of the polygon $\quad\quad = 17 \cdot 4 \, \text{cm}$

   The total sides of polygon $\quad\quad\quad = 17 \cdot 4 \div 2 \cdot 9 = 6$

7. Sujata had ribbon $= 18 \cdot 24 \, \text{cm}$

   She has divide it equaly in $\neq$ six girls

   The length of each ribbon $= 18 \cdot 24 \div 6 = 3 \cdot 04 \, \text{m}$

8. The number of total sheets $= 12$

   The thickness of 12 sheets of paper $= 3 \cdot 24 \, \text{mm}$

   The thickness of one sheet of paper $= 12 \div 3 \cdot 24 = 3 \cdot 70 \, \text{mm}$

9. The seats in the balgony of a theater 125

   If this is $\dfrac{1}{5}$ of the total seats, then the number of seats in the theater $= 125 \times \dfrac{1}{5} = \dfrac{125}{5} = 5 \, \text{seats}$

10. The product of two decimals $= 42 \cdot 987$

   One decimal is $= 12 \cdot 46$ The other $= 42 \cdot 987 \div 12 \cdot 46 = 3 \cdot 45$

Objective Type Questions

1. (i) **2.** (iii) **3.** (i) **4.** (iv) **5.** (iii) **6.** (iii) **7.** (iv) **8.** (iii)

True/False

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

Chapter Assessment

1. (i) 8·975   (ii) 29·423   (iii) 78·358   (iv) 71.76
   (v) 1·46   (vi) 32·57   (vii) 2·1   (viii) 36·27
2. (i) 0·4   (ii) 0·9   (iii) 11   (iv) 3·59
3. (i) 7·1   (ii) 14,000   (iii) 9·415   (iv) 4·7
   (v) 3960   (vi) 800   (vii) 75   (viii) 830
4. (i) 41·38   (ii) 0·08   (iii) 135·0   (iv) 2318·0
   (v) 10·4   (vi) 33·83   (vii) 481·44   (viii) 0·4208
   (ix) 0·171   (x) 45·31   (xi) 0·402   (xii) 0·020556
5. (i) 0·812   (ii) 0·98612   (iii) 88·9766   (iv) 8·7446
   (v) 10·2   (vi) 33·35   (vii) 0·00611   (viii) 0·042
6. (i) 57·33   (ii) 5733   (iii) 0·5733   (iv) 57·33
7. (i) 105·4   (ii) 1·054   (iii) 1054   (iv) 10540
8. 20 minutes   **9.** 202·5   **10.** 55·62 km/h
11. 3·3 kg   **12.** 2·68

Chapter-4 Rational Numbers

Exercise = 4.1

1. The rational numbers are (ii) $\dfrac{-9}{5}$ (iv) $\dfrac{-7}{-1}$ (v) $\dfrac{0}{10}$ (vi) $\dfrac{0}{11}$

2. (i) -7 (ii) 0 (iii) $= -9$ (iv) 6 (v) -22 (vi) -14

3. (i) $\dfrac{6}{1}$, numerator = 6, denominator = 1   (ii) $\dfrac{-7}{1}$, numerator = -7, denominators = 1

   (iii) $\dfrac{1}{1}$, numerator = 1, denominator = 1   (iv) $\dfrac{0}{1}$, numerator = 0, denominator = 1

4. (i) positive   (ii) negative   (iii) positive
   (iv) negative   (v) positive   (vi) negative

5. (i) $\dfrac{7}{12} = \dfrac{7\times2}{12\times2} = \dfrac{7\times3}{12\times3} = \dfrac{7\times4}{12\times4} = \dfrac{7\times5}{12\times5} = \dfrac{14}{24} = \dfrac{21}{36} = \dfrac{28}{48} = \dfrac{35}{60}$

   (ii) $\dfrac{-4}{9} = \dfrac{(-4)\times2}{9\times2} = \dfrac{(-4)\times3}{9\times3} = \dfrac{(-4)\times4}{9\times4} = \dfrac{(-4)\times5}{9\times5} = \dfrac{-8}{18} = \dfrac{-12}{27} = \dfrac{-16}{36} = \dfrac{-20}{45}$

   (iii) $\dfrac{8}{-16} = \dfrac{16}{32}, \dfrac{24}{48}, \dfrac{32}{64}, \dfrac{40}{80}$ (iv) $\dfrac{7}{1}, = \dfrac{14}{2}, \dfrac{21}{3}, \dfrac{28}{4}, \dfrac{35}{5}$

   (v) $\dfrac{1}{1} = \dfrac{2}{2}, \dfrac{3}{3}, \dfrac{4}{4}, \dfrac{5}{5}$ (vi) $\dfrac{-1}{1} = \dfrac{-2}{2}, \dfrac{-3}{3}, \dfrac{-4}{4}, \dfrac{-5}{5}$

6. (i) $\dfrac{-11}{-13} = \dfrac{11}{13}$ (ii) $\dfrac{7}{-22} = \dfrac{-7}{22}$ (iii) $\dfrac{-146}{-199} = \dfrac{146}{199}$ (iv) $\dfrac{49}{-69} = \dfrac{-49}{69}$

7. (i) $\dfrac{-9}{14} = \dfrac{9}{-14}$ (ii) $\dfrac{-19}{-30} = \dfrac{19}{30}$ (iii) $\dfrac{-48}{39} = \dfrac{48}{-39}$ (iv) $\dfrac{-48}{-33} = \dfrac{48}{33}$

8. (i) $\dfrac{9}{-5}, \dfrac{x}{10} = \dfrac{9\times2}{5\times2} = \dfrac{18}{10}$ (ii) $\dfrac{8}{7}, \dfrac{x}{-35} = \dfrac{8\times(-5)}{7\times(-5)} = \dfrac{-40}{-35}$

(iii) $\dfrac{36}{x}$, $2 = 36 \div 2 = 18$, $x = 18$ (iv) $\dfrac{x}{6}$, $-13 = -13 \times 6 = -78$

9.   (i) $\dfrac{4}{9}$ and $\dfrac{44}{99} = \dfrac{4 \times 11}{9 \times 11} = \dfrac{44}{99}$ So, $\dfrac{4}{9}$ and $\dfrac{44}{99}$ are equivalent number.

     (ii) $\dfrac{7}{-3}$ and $\dfrac{35}{-15} = \dfrac{7 \times 5}{-3 \times 5} = \dfrac{35}{-15}$ So, $\dfrac{7}{-3}$ and $\dfrac{35}{-15}$ are equivalent number.

     (iii) $\dfrac{-3}{5}$ and $\dfrac{-12}{20} = \dfrac{-3 \times 4}{5 \times 4} = \dfrac{-12}{20}$

       So, $\dfrac{-3}{5}$ and $\dfrac{-12}{20}$ are equivalent number.

10.   (i) -21 and $\dfrac{-3}{7} = \dfrac{-3 \times (-3)}{7 \times (-3)} = \dfrac{9}{-21}$ (ii) 70 and $\dfrac{-3}{7} = \dfrac{-3 \times 10}{7 \times 10} = \dfrac{-30}{70}$

     (iii) 63 and $\dfrac{-3}{7} = \dfrac{-3 \times 9}{7 \times 9} = \dfrac{-27}{63}$ (iv) -35 and $\dfrac{-3}{7} = \dfrac{-3 \times (-5)}{7 \times (-5)} = \dfrac{15}{-35}$

11.   (i) $\dfrac{420}{-720} = 420 \div (-28) = 15$ So, $\dfrac{420 \div (-15)}{-720 \div (-15)} = \dfrac{-28}{48}$

     (ii) $\dfrac{420}{-720}$, $420 \div (-35) = -12$ So, $\dfrac{420 \div (-12)}{-720 \div (-12)} = \dfrac{-35}{60}$

     (iii) $\dfrac{420}{-720}$, $420 \div 70 = 6$ So, $\dfrac{420 \div 6}{-720 \div 6} = \dfrac{70}{120}$

     (iv) $\dfrac{420}{-720} = 420 \div (-105) = (-4)$ $\dfrac{420 \div (-4)}{-720 \div (-4)} = \dfrac{-105}{180}$

12. Do your self.

<div align="center">Exercise-4.2</div>

1.   (i) $\dfrac{3}{4}$

     (ii) $\dfrac{-7}{4}$
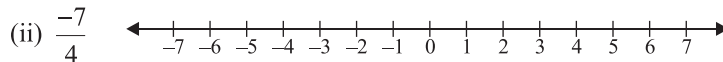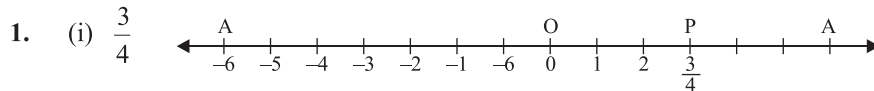
     (iii) to (viii) do your self

2.   (i) $\dfrac{5}{8}$ (ii) $\dfrac{8}{9}$ (iii) $\dfrac{-6}{7}$ (iv) $\dfrac{-8}{3}$ (v) $\dfrac{-5}{-21}$ (vi) $\dfrac{5}{-8}$

3.   (i) $\dfrac{-3}{-8}$ (ii) $\dfrac{5}{-8}$ (iii) $\dfrac{-6}{-13}$ (iv) $\dfrac{16}{-5}$ (v) $\dfrac{-4}{3}$ (vi) -3

4.   (i) $\dfrac{-5}{3} < \dfrac{-4}{5} < \dfrac{-4}{5} < \dfrac{1}{7}$ (ii) $\dfrac{-12}{10} < \dfrac{-13}{15} < \dfrac{3}{7} < \dfrac{11}{5}$

     (iii) $\dfrac{-13}{-3} < \dfrac{-3}{21} < \dfrac{2}{7} < \dfrac{10}{21}$ (iv) $\dfrac{7}{-8} < \dfrac{-3}{4} < \dfrac{-11}{16} < \dfrac{0}{2}$

5.   (i) $\dfrac{140}{28} > \dfrac{64}{16} > \dfrac{7}{8} > \dfrac{5}{-4} > \dfrac{36}{-12}$ (ii) $\dfrac{-3}{10} > \dfrac{7}{-15} > \dfrac{-11}{20} > \dfrac{17}{20}$

6.   (i) $>$ (ii) $<$ (iii) $>$ (iv) $=$ 7. $P = \dfrac{7}{3}, Q = \dfrac{8}{3}, R = \dfrac{-7}{3}, S = \dfrac{-5}{3}$

<div align="center">(15)</div>

8. (i) $\dfrac{-5}{6}, \dfrac{-1}{6}, \dfrac{-3}{6}, \dfrac{-2}{6}$ and $\dfrac{-1}{6}$ (ii) $\dfrac{-11}{6}, \dfrac{-10}{6}, \dfrac{-9}{6}, \dfrac{-8}{6}, \dfrac{-7}{6}$

(iii) $\dfrac{39}{120}, \dfrac{38}{120}, \dfrac{37}{120}, \dfrac{36}{120}, \dfrac{35}{120}$ (iv) $\dfrac{-13}{24}, \dfrac{-14}{24}, \dfrac{-15}{24}, \dfrac{-16}{24}, \dfrac{-17}{24}$

(v) $\dfrac{10}{45}, \dfrac{11}{45}, \dfrac{12}{45}, \dfrac{13}{45}, \dfrac{14}{45}$ (vi) $\dfrac{-35}{45}, \dfrac{-34}{45}, \dfrac{-33}{45}, \dfrac{-32}{45}, \dfrac{-31}{45}$

9. (i) $\dfrac{-4}{20}, \dfrac{-5}{25}, \dfrac{-6}{30}$ (ii) $\dfrac{8}{-12}, \dfrac{10}{-15}, \dfrac{12}{-18}$ (iii) $\dfrac{5}{-30}, \dfrac{6}{-36}, \dfrac{7}{-42}$

(iv) $\dfrac{-15}{35}, \dfrac{-18}{42}, \dfrac{-21}{49}$ (v) $\dfrac{10}{-55}, \dfrac{12}{-66}, \dfrac{14}{-77}$ (vi) $\dfrac{-25}{60}, \dfrac{30}{-72}, \dfrac{-35}{84}$

Exercise = 4.3

1. (i) -6 (ii) 8 (iii) $\dfrac{-3}{17}$ (iv) $\dfrac{13}{19}$ (v) $\dfrac{17}{21}$ (vi) 0

2. (i) $\dfrac{5}{6}+\dfrac{-1}{6}=\dfrac{5-1}{6}=\dfrac{\cancel{4}}{\cancel{6}}=\dfrac{2}{3}$ (ii) $=\dfrac{2}{3}+\dfrac{-4}{3}=\dfrac{2-4}{3}=\dfrac{-2}{3}$

(iii) $\dfrac{-5}{7}+\dfrac{-6}{-7}=\dfrac{-5}{7}+\dfrac{-6}{-7}=\dfrac{-5+6}{7}=\dfrac{1}{7}$ (iv) $\dfrac{3}{9}+\dfrac{1}{-9}=\dfrac{3}{9}-\dfrac{1}{9}=\dfrac{3-1}{9}=\dfrac{2}{9}$

(v) $\dfrac{-4}{5}+\dfrac{-1}{5}=\dfrac{(-4)+(-1)}{5}=\dfrac{-5}{5}=-1$ (vi) $\dfrac{-3}{8}+\dfrac{-1}{8}=\dfrac{(-3)+(-1)}{8}=\dfrac{-4}{8}=\dfrac{-1}{2}$

3. (i) $\dfrac{-3}{5}+\dfrac{7}{5}+\dfrac{-1}{5}=\dfrac{(-3)+7+(-1)}{5}=\dfrac{3}{5}$

(ii) $\dfrac{-12}{7}+\dfrac{3}{7}+\dfrac{-2}{7}=\dfrac{(-12)+3+(-2)}{7}=\dfrac{-11}{7}$

(iii) $\dfrac{11}{12}+\dfrac{3}{-8}+\dfrac{1}{4}=\dfrac{22+9+6}{-24}=\dfrac{37}{-24}$

(iv) $\dfrac{-16}{9}+\dfrac{-5}{12}+\dfrac{7}{8}=\dfrac{-64-15+14}{36}=\dfrac{-64-1}{36}=\dfrac{-65}{36}$

(v) and (vi) as similar as (i) to (iv). So, do your self.

4. (i) $\dfrac{4}{7}-\dfrac{3}{8}=\dfrac{32-21}{56}=\dfrac{11}{56}$ (ii) $\dfrac{-8}{13}-0=\dfrac{-8}{13}$

(iii) $\dfrac{4}{15}-\dfrac{13}{17}=\dfrac{68-195}{255}=\dfrac{-127}{255}$

(iv) $0-\dfrac{-17}{27}=0$ (v) and (vi) as similar as (i) to (iv). So, do your self.]

5. (i) $-\dfrac{4}{5}-\dfrac{3}{15}+\dfrac{7}{20}=\left(-\dfrac{4}{5}-\dfrac{3}{15}\right)+\dfrac{7}{20}=\left(\dfrac{-12-3}{5}\right)+\dfrac{7}{20}$

$=\dfrac{-15}{15}+\dfrac{7}{20}=\dfrac{-60+21}{60}=\dfrac{-39}{60}=\dfrac{13}{20}$

(ii) $\dfrac{-5}{13}-\dfrac{-3}{26}-\dfrac{9}{-52}=\dfrac{-20+6+9}{52}=\dfrac{-20+15}{52}=\dfrac{-5}{52}$

(iii) and (iv) Similar as (i) and (ii) so, do your self.

6. (i) $\dfrac{13}{6} = 2 + \dfrac{1}{6}$ (ii) $\dfrac{-13}{9} = -1 + \left(\dfrac{-4}{9}\right)$

(iii) $\dfrac{-35}{11} = -3 + \left(\dfrac{-2}{11}\right)$ (iv) $\dfrac{-105}{20} = -5 + \left(\dfrac{-5}{20}\right)$

7. $-5 - \dfrac{2}{3} = \dfrac{-5}{1} - \dfrac{2}{3} = \dfrac{-15-2}{3} = \dfrac{-17}{3}$

8. $1 - \dfrac{-3}{4} = \dfrac{1}{1} - \dfrac{-3}{4} = \dfrac{4-(-3)}{4} = \dfrac{7}{4}$

9. $\dfrac{-1}{2} + \dfrac{-3}{3} - \dfrac{-11}{20} = \dfrac{-10-12+11}{20} = \dfrac{-22+11}{20} = \dfrac{-11}{20}$

10. Do your self.

Exercise = 4.4

1. (i) $17 = \dfrac{1}{17}$ (ii) $-15 = \dfrac{-1}{15}$ (iii) $\dfrac{14}{25} = \dfrac{25}{14}$ (iv) $\dfrac{-18}{13} = \dfrac{-13}{18}$

2. (i) $\dfrac{-16}{21} \times \dfrac{14}{5} = \dfrac{-16 \times 14}{21 \times 5} = \dfrac{-224}{105} = \dfrac{-32}{15}$

(ii) $\dfrac{7}{6} \times \dfrac{-3}{28} = \dfrac{-21}{168} = \dfrac{-7}{56} = \dfrac{-1}{8}$

(iii) $\dfrac{=19}{36} \times 16 = \dfrac{-19}{36} \times \dfrac{16}{1} = \dfrac{-19 \times 16}{36 \times 1} = \dfrac{\cancel{152}}{\cancel{18}} = \dfrac{-76}{9}$

(iv) $\dfrac{-13}{9} \times \dfrac{27}{-26} = \dfrac{-13 \times 27}{9 \times (-26)} = \dfrac{\cancel{-351}}{\cancel{234}} = \dfrac{3}{2}$

(v), (vi), (vii) and (viii) as similar as (i) to (iv). So, Do your self.

3. (i) $-12 \div \dfrac{9}{5} = \dfrac{-12}{1} \div \dfrac{9}{5} = \dfrac{-12}{1} \times \dfrac{5}{9} = \dfrac{-60}{9} = \dfrac{-20}{3} = -6\dfrac{2}{3}$

(ii) $\dfrac{-3}{8} \div 7 = \dfrac{-3}{8} \div \dfrac{7}{1} = \dfrac{-3}{8} \times \dfrac{1}{7} = \dfrac{-3}{56}$

(iii) $\dfrac{-7}{12} \div \dfrac{-2}{63} = \dfrac{-7}{12} \times \dfrac{63}{-2} = \dfrac{-441}{-24} = \dfrac{147}{8}$

(iv), (v) and (vi) as similar as (i) to (iii). So, do your self.

4. (i) $\left(\dfrac{11}{3} \times \dfrac{-13}{5}\right) - \dfrac{4}{15} = \dfrac{-143}{15} - \dfrac{4}{15} = \dfrac{-143-4}{15} = \dfrac{-147}{15}$

(ii) $\left(\dfrac{1}{3} + \dfrac{5}{6} - \dfrac{1}{6}\right) \div \dfrac{4}{5} = \left(\dfrac{1}{3} + \dfrac{5}{6}\right) - \dfrac{1}{6} \div \dfrac{4}{5} = \left(\dfrac{2+5}{6}\right) - \dfrac{1}{6} \div \dfrac{4}{5}$

$= \left(\dfrac{7}{6} - \dfrac{1}{6}\right) \div \dfrac{4}{5} = \left(\dfrac{7-1}{6}\right) \div \dfrac{4}{5} = \dfrac{6}{6} \div \dfrac{4}{5} = \dfrac{6}{6} \times \dfrac{5}{4} = \dfrac{30}{24} = \dfrac{5}{4}$

(iii) $\dfrac{3}{4} \div \dfrac{5}{8} \times \dfrac{5}{7} + \dfrac{2}{9} - \dfrac{1}{9} = \left(\dfrac{3}{4} \div \dfrac{5}{8}\right) \times \dfrac{5}{7} + \dfrac{2}{9} - \dfrac{1}{9}$

$= \left(\dfrac{3}{4} \times \dfrac{8}{5}\right) \times \dfrac{5}{7} + \dfrac{2}{9} - \dfrac{1}{9} = \left(\dfrac{24}{20} \times \dfrac{5}{7}\right) + \dfrac{2}{9} - \dfrac{1}{9}$

$$= \left(\frac{120}{140} + \frac{2}{9} \right) - \frac{1}{9} = \left(\frac{1080 + 280}{1260} \right) - \frac{1}{9} = \frac{1,360}{1,260} - \frac{1}{9}$$

$$= \frac{1,360 - 140}{1,260} = \frac{1,220}{1,260} = \frac{61}{63}$$

(iv), (v) and (vi) as similar as (i) to (vii). So, do your self.

5. $\dfrac{7}{5} - \dfrac{5}{7} = \dfrac{49 - 25}{35} = \dfrac{24}{35}$

6.   Yes

7.   (i) $\dfrac{-14}{19}$ (ii) $\dfrac{4}{5}$ (iii) $\dfrac{-3}{4}$ (iv) 10

8. $15 - \dfrac{-2}{3} = \dfrac{15}{1} - \dfrac{-2}{3} = \dfrac{45 - (-2)}{3} = \dfrac{-47}{3}$

9. $\dfrac{7}{2} \div \dfrac{-5}{4} = \dfrac{7}{2} \times \dfrac{4}{-5} = \dfrac{28}{-10} = \dfrac{14}{5}$

10. $\left(\dfrac{2}{5} + \dfrac{3}{7} \right) \div \dfrac{4}{7} = \left(\dfrac{14 + 15}{35} \right) \div \dfrac{4}{7} = \dfrac{29}{35} \div \dfrac{4}{7} = \dfrac{29}{35} \times \dfrac{7}{4} = \dfrac{203}{140} = \dfrac{29}{20}$

11. $\left(\dfrac{5}{9} - \dfrac{3}{5} \right) \div \left(\dfrac{5}{7} \times \dfrac{28}{3} \right) = \left(\dfrac{25 - 27}{45} \right) \div \dfrac{140}{21}$

$$= \dfrac{-2}{45} \div \dfrac{140}{21} = \dfrac{-2}{45} \times \dfrac{21}{140} = \dfrac{-42}{6,300} = \dfrac{-1}{150}$$

12, 13, 14 and 15 as similar as 10. and 11. So, do your self.

Objective Type Questions

1. (i) 2. (iv) 3. (iv) 4. (iii) 5. (i) 6. (iii) 7. (ii) 8. (iii) 9. (i) 10. (iv)

Fill in the blanks

1. Rational number 2. Infinite 3. Positive 4. Additive 5. Rational number 6. Zero.

Matching

1. (v) 2. (iii) 3. (vi) 4. (i) 5. (iv) 6. (ii)

Chapter Assessment

1.   (i) $-1\dfrac{2}{3}$ (ii) $-1\dfrac{1}{3}$ (iii) $-1\dfrac{1}{6}$ (iv) $1\dfrac{2}{3}$

2.   (i), (iii) and (iv) are equivalent rational numbers.

3.   (i) $\dfrac{-13}{-5}$ (ii) $\dfrac{-5}{6}$ (iii) $\dfrac{1}{4}$ (iv) $-\dfrac{7}{12}$ (v) $\dfrac{7}{8}$ (vi) $\dfrac{-2}{5}$

4.   (i) $\dfrac{2}{3} < \dfrac{5}{6} < \dfrac{7}{8}$ (ii) $\dfrac{27}{55} < \dfrac{9}{10} < \dfrac{10}{11}$

    (iii) $\dfrac{-4}{3} < \dfrac{-2}{9} < \dfrac{1}{3}$ (iv) $\dfrac{-5}{7} < \dfrac{-3}{7} < \dfrac{-1}{7}$

5.   (i) $\dfrac{-7}{18}$ (ii) $-1\dfrac{7}{30}$

6.   (i) $\dfrac{9}{13}$ (ii) $\dfrac{-1}{6}$ (iii) $\dfrac{37}{8}$ (iv) $\dfrac{7}{6}$ (v) 0   (vi) 1

7. (i) $\dfrac{-4}{5}$ (ii) 0 (iii) $\dfrac{-12}{21}$ (iv) $\dfrac{14}{33}$ (v) 1 (vi) -2,

8. (i) $\dfrac{-9}{16}$ (ii) $\dfrac{7}{11}$ (iii) -3 (iv) $1\dfrac{5}{27}$

9. (i) $\dfrac{-5}{26}$ (ii) $\dfrac{-5}{14}$ (iii) $\dfrac{34}{9}$ (iv) $\dfrac{77}{23}$

10. (-36) 11. $\dfrac{2}{9}$ 12. $\dfrac{7}{10}$ kg, 13. ₹ 424 14. 18 15. $\dfrac{1}{6}$ part.

Chapter-5 Exponents (Powers)

Exercise = 5.1

1. (i) B = 7, E = 14 (ii) B = $\dfrac{1}{3}$, E = 5 (iii) B = 875, E = -3

   (iv) B = -4, E = 9 (v) B = -1, E = 15 (vi) B = $\dfrac{1}{7}$, E = 6

2. (i) $(-5)^6$ (ii) 3^{17} (iii) $11^3 a^2 b^2$
   (iv) $ab^3 c^2$ (v) $(-17)^1$

3. (i) $11 \times 11 \times 11 \times 11 = 14641$
   (ii) $(-4) \times (-4) \times (-4) \times (-4) = 256$
   (iii) $(4 \times 4 \times 4) \times (3 \times 3 \times 3) = 5184$
   (iv) $(-9)^3 \times (-9) \times (-9) \times 4 \times 4 = -11664$
   (v) $(-1) \times (-1) \times (-1) \times (-1) \times \ldots\ldots 73$ times $= (-1)$
   (vi) $(6 \times 6 \times 6) \times (-6) \times (-6) = 7,776$
   (vii) $(-1) \times (-1) \times (-1) \times (-1) \ldots\ldots 111$ times $\times (-1) \times (-1) \times (-1) \times (-1) \times (-1) \ldots\ldots 35$ times
$= 1$
   (viii) $(-3) \times (-3) \times (-3) \times (-3) \times (-3) \times (-3) \times (-3) \times 0 \times (-2) \times (-2) = 0$

4. (i) $243 = 3^5$ (ii) $512 = 2^9$
   (iii) $2048 = 2^{11}$ (iv) $2187 = 3^7$

5. (i) $5 \times 5 \times 5 \times 5 = 625$, $4 \times 4 \times 4 \times 4 \times 4 = 1024$, So, $625 < 1024$, 4^5 is greater
   (ii) $2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$, $6 \times 6 = 36$
       So, $64 > 36$, 2^6 is greater.
   (iii) $3 \times 3 \times 3 \times 3 \times 3 = 243$, $5 \times 5 \times 5 = 125$
       So, $243 > 125$, 3^5 is greater
   (iv) $7 \times 7 = 49$, $2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$
       So, $49 < 64$, 2^6 is greater

6. (i) $648 = 2 \times 324$

$$
\begin{array}{r|r}
2 & 6\ 4\ 8 \\
\hline
2 & 3\ 2\ 4 \\
\hline
2 & 1\ 6\ 2 \\
\hline
3 & 8\ 1 \\
\hline
3 & 2\ 7 \\
\hline
3 & 9 \\
\hline
3 & 3 \\
\hline
 & 1
\end{array}
$$

   $= 2 \times 2 \times 162$
   $= 2 \times 2 \times 2 \times 81$
   $= 2 \times 2 \times 2 \times 3 \times 27$
   $= 2 \times 2 \times 2 \times 3 \times 3 \times 9$
   $= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$
   $= 2^3 \times 3^4$

(ii) $540 = 2 \times 270$

$\quad\quad = 2 \times 2 \times 135$

$\quad\quad = 2 \times 2 \times 3 \times 45$

$\quad\quad = 2 \times 2 \times 3 \times 3 \times 15$

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

$\quad\quad = 2^2 \times 3^3 \times 5$

2	5 4 0
2	2 7 0
3	1 3 5
3	4 5
3	1 5
5	5
	1

(iii) $1372 = 2 \times 686$

$\quad\quad = 2 \times 2 \times 343$

$\quad\quad = 2 \times 2 \times 7 \times 49$

$\quad\quad = 2 \times 2 \times 7 \times 7 \times 7$

$\quad\quad = 2^2 \times 7^3$

2	1 3 7 2
2	6 8 6
7	3 4 3
7	4 9
7	7
	1

(iv) $3600 = 2 \times 1800$

$\quad\quad = 2 \times 2 \times 900$

$\quad\quad = 2 \times 2 \times 2 \times 450$

$\quad\quad = 2 \times 2 \times 2 \times 2 \times 225$

$\quad\quad = 2 \times 2 \times 2 \times 2 \times 3 \times 75$

$\quad\quad = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 25$

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

$\quad\quad = 2^4 \times 3^2 \times 5^2$

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

7. (i) $7776 = 6 \times 6 \times 6 \times 6 \times 6 = 6^5$

(ii) $-2187 = (-3) \times (-3) \times (-3) \times (-3) \times (-3) \times (-3) \times (-3) = (-3)^7$

Exercise = 5.2

1. (i) $4^{13} \times 4^{19} \ 4^{13+19} = 4^{32}$

(ii) $8^2 \times 8^3 \times 8^4 = 8^{2+3+4} = 8^9$

(iii) $9^5 \div 9 = 9^{5-1} = 9^4$

(iv) $10^{10} \div 10^6 = 10^{10-6} = 10^4$

(v) $[(8)^3]^5 = 8^{3 \times 5} = 8^{15}$

(vi) $[(5)^3]^8 = 5^{3 \times 8} = 5^{24}$

(vii) $[(2^3)^4]^5 = (2^{3 \times 4})^5 = 2^{12 \times 5} = 2^{60}$

(viii) $7^4 \times 7^5 \div 7^3 = 7^{4+5} \div 7^3 = 7^9 \div 7^3 = 7^{9-3} = 7^6$

2. (i) $\dfrac{3^5 \times 10^5 \times 25}{5^7 \times 6^5} = \dfrac{3^5 \times (2 \times 15)^5 \times 5^2}{5^7 \times (2 \times 3)^5} = \dfrac{3^5 \times 2^5 \times 5^5 \times 5^2}{5^7 \times 2^5 \times 3^5} = 1$

(ii) $\dfrac{2^3 \times 3^4 \times 4}{3 \times 3^2} = \dfrac{2^3 \times 3^4 \times 2^2}{3^{1+2}} = \dfrac{2^5 \times 3^4}{3 \times 3^3} = 2^5 \times 3^{4-3} = 2^5 \times 3$

(iii) $\dfrac{3 \times 7^2 \times 11^3}{21 \times 11^3} = \dfrac{3 \times 7^2 \times 11^8}{3 \times 7 \times 11^3} = 7^{2-1} \times 11^{8-3} = 7 \times 11^5$

(iv) $2^0 \times 3^0 \times 4^0 = 1 \times 1 \times 1 = 1$

(v) $(2^3 \times 2)^2 = (2^4)^2 = 2^8$

(vi) $25^4 \div 5^3 = \dfrac{(5^2)^4}{5^3} = 5^{8-3} = 5^5$

(**20**)

3. (i) $(6^2)^2 = 6^{2\times2} = 6^4$ (ii) $\{(-3)^2\}^3 = (-3)^{2\times3} = (-3)^6$

(iii) $\left\{\left(\dfrac{1}{5}\right)^3\right\}^2 = \left(\dfrac{1}{5}\right)^{3\times2} = \left(\dfrac{1}{5}\right)^6$ (iv) $(10^3)^4 = 10^{3\times4} = 10^{12}$

(v) $\left\{\left(\dfrac{-1}{3}\right)^4\right\}^2 = \left(\dfrac{-1}{3}\right)^{4\times2} = \left(\dfrac{-1}{3}\right)^8$ (vi) $(x^2)^a = x^{2\times a} = x^{2a}$

(vii) $(b^m)^n = b^{m\times n} = b^{mn}$

(viii) $\{(-2)^x\}^3 = (-2)^{x\times3} = (-2)^{x3}$

4. (i) $\left(\dfrac{2}{7}\right)^{-3} \div \left(\dfrac{2}{7}\right)^{-2} = \left(\dfrac{2}{7}\right)^{-3+2} = \dfrac{2}{7} = \dfrac{7}{2}$

(ii) $\left(\dfrac{3}{5}\right)^{-4} \times \left(\dfrac{3}{5}\right)^4 + \left(\dfrac{1}{4}\right)^5 \times \left(\dfrac{1}{4}\right)^{-5} = \left(\dfrac{3}{5}\right)^{-4+4} + \left(\dfrac{1}{4}\right)^{5-5}$

$= \left(\dfrac{3}{5}\right)^6 + \left(\dfrac{1}{4}\right)^6 = 1+1 = 2$

(iii) $\left(\dfrac{1}{2}\right)^{-3} + \left(\dfrac{1}{3}\right)^{-2} + \left(\dfrac{1}{4}\right)^{-1} = 2^3 + 3^2 + 4 = 8+9+4 = 21$

(iv) $\left[\left(\dfrac{-4}{5}\right)^{-2} \times \left(\dfrac{-4}{6}\right)^3 \times \left(\dfrac{-4}{5}\right)^{-1}\right]^2 = \left(\dfrac{-4}{5}\right)^{-2+3} \times \left(\dfrac{-4}{5}\right)^2$

$= \left(\dfrac{-4}{5}\right)^{-2+3-2} = \left(\dfrac{-4}{5}\right)^{-1} = \dfrac{-4}{5} = -\dfrac{5}{4}$

5. (i)
```
2 | 2 7 0
3 | 1 3 5
3 |   4 5
3 |   1 5
5 |     5
          1
```

(ii)
```
2 | 7 6 8
2 | 3 8 4
2 | 1 9 2
2 |   9 6
2 |   4 8
2 |   2 4
2 |   1 2
2 |     6
3 |     3
          1
```

$270 = 2\times5\times3^3$

$768 = 2\times2\times2\times2\times2\times2\times2\times2\times3 = 2^8 \times 3$

(iii) 64×729

$64 = 2\times2\times2\times2\times2\times2 = 2^6$

$729 = 3\times3\times3\times3\times3\times3 = 3^6$

$64 \times 729 = 2^6 \times 3^6$

```
2 | 6 4      3 | 7 2 9
2 | 3 2      3 | 2 4 3
2 | 1 6      3 |   8 1
2 |   8      3 |   2 7
2 |   4      3 |     9
2 |   2      3 |     3
        1              1
```

(iv) is as similar as (iii). So, do your self.

6. $9\times9\times9 = 729, \ 3\times3\times3\times3\times3\times3 = 729 = 3^6$

7. (i) $(2^2)^n \times 5^{n-4} \ 2^{2n} = 2^{12}$ on comparing the powers

$2n = 12, \boxed{n = 6}$

(ii) $2^{5n} + 2^n = 2^4$

(**21**)

$$2^{5n-n} = 2^4$$
$$2^{4n} = 2^4$$

an comparing the powers, $n = 4$, $\quad n = \dfrac{4}{4}$, $\quad n = 1$

(iii) $2^{n-5} \times 5^{n-4} = 5$

$$= 2^{n-5} \times \dfrac{5^{n-4}}{5} = 1 \quad = 2^{n-5} \times 5^{n-4} = 1$$

$2^{n-5} \times 5^{n-5} = 1, (2 \times 5)^{n-5} = (2 \times 5)^0, n-5 = 0, n = 5$

(iv), (v) and (vi) similar as (i) to (iii), So, do your self.

8. $\dfrac{p}{q} = \left(\dfrac{2}{3}\right)^2 \div \left(\dfrac{6}{7}\right)^0$

$$\dfrac{p}{q} = \left(\dfrac{2}{3}\right)^2 \div 1, \dfrac{p}{q} = \dfrac{4}{9}, \left(\dfrac{p}{q}\right)^3 = \left(\dfrac{4}{9}\right)^3 = \dfrac{64}{729}$$

9. $\dfrac{10 \times 5^{n+1} + 25 \times 5^n}{3 \times 5^{n+2} + 10 \times 5^{n+1}} = \dfrac{2 \times 5 \times 5^{n+1} + 5 \times 5 \times 5^n}{3 \times 5^{n+2} + 2 \times 5 \times 5^{n+1}}$

$$= \dfrac{2 \times 5^{n+2} + 5^{n+2}}{3 \times 5^{n+2} + 2 \times 5^{n+2}} = \dfrac{\cancel{5^{n+2}}\,(2+1)}{\cancel{5^{n+2}}\,(3+2)} = \dfrac{3}{5}$$

10. $\dfrac{9^n \times 3^2 \times 3^n - (27)^n}{(3^3)^5 \times 2^3} = \dfrac{1}{27}$

$$= \dfrac{(3^2)^n \times 3^{n+2} - (3^3)^n}{3^{15} \times 2^3} = \dfrac{1}{27}, \quad \dfrac{3^{2n+n+2} - 3^{3n}}{27} = \dfrac{1}{27}$$

$$= \dfrac{3^{3n+2} - 3^{3n}}{3^{15} \times 2^3} = \dfrac{1}{27}, \quad \dfrac{3^2 \cdot 3^{3n} - 3^{3n}}{3^{15} \times 2^3} = \dfrac{1}{3^3}$$

$$= \dfrac{9 \cdot 3^{3m} - 3^{3n}}{3^{15} \times 2^3} = \dfrac{1}{3^3}, \quad \dfrac{8 \cdot 3^{3n}}{3^{15} \cdot 2^3} = \dfrac{1}{3^3}, \quad \dfrac{2^{\cancel{3}} \cdot 3^{3n}}{3^{15} \cdot 2^{\cancel{3}}} = \dfrac{1}{3^3}$$

$$= \dfrac{3^n}{3^5} = \dfrac{1}{3^3}, \quad 3^{n-5} = 3^{-3}, \quad n-5 = -3, \quad n = 5-3, \quad n = 2$$

Exercise = 5.3

1. (i) 19 billian. $= 190000000001 \cdot 9 \times 10^{10}$ (ii) 356 million $= 356000000 = 3 \cdot 56 \times 10^0$

(iii) $27400000000 = 2 \cdot 74 \times 10^{10}$ (iv) $784 \cdot 847 = 7 \cdot 843 \times 10^2$

2. (i) $7 \cdot 5 \times 107 = 75000000$ (ii) $5 \cdot 064 \times 10^3 = 5064$

(iii) $3 \cdot 7 \times 10^6 = 37000000$ (iv) $4 \cdot 44 \times 10^4 = 44400$

3. (i) diamteen of earth $= 12756000\,\text{m} = 1 \cdot 2756 \times 10^7$ m $= 1.2756 \times 10^7$ m.

(ii) $3 \cdot 84 \times 10^8$ m   (iii) $1 \cdot 027 \times 10^9$

(iv) $1 \cdot 0 \times 10^{11}$ (v) $1 \cdot 2 \times 10^{10}$ years.

Objective Type Questions

1. (ii) **2.** (iii) **3.** (i) **4.** (iv) **5.** (iv) **6.** (iii) **7.** (i) **8.** (i)

Fill in the blanks

1. exponents **2.** multiplication **3.** exponential **4.** power **5.** base

True/False

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

Chapter Assessment

1.   (i) 2^8 (ii) 3^4 (iii) 5^4

2.   (i)   144   (ii) 3430000   (iii) 190000   (iv)   24

       (v)   225   (vi) 225   (vi) 1944

3.   (i) 3^6 (ii) 3^5 (iii) 2^{10} (iv) 3^2 (v) 2^8

4.   (i) $2^3 \times 5^3$ (ii) $2^7 \times 5^3$ (iii) $2^4 \times 3^2 \times 5^2$

5.   (i)   25   (ii) 216   (iii) $\dfrac{27}{8}$ (iv) $\dfrac{169}{36}$

6.   (i) $(2a)^2$ (ii) 3^3 (iii) 2   (iv) 162

7.   (i) $\dfrac{1}{81}$ (ii) 30   (iii) $\dfrac{6}{5}$ (iv) -10

8.   (i)   1   (ii) -2

9. $-\dfrac{128}{675}$

10.   (i) $3 \cdot 0 \times 10^8$ m/D   (ii) 1×10^{11} (iii) $8 \cdot 6 \times 10^{28}$ g

       (iv) $1 \cdot 49 \times 10^{11}$ mv   (v) $4 \cdot 8 \times 10^9$ (vi) $1 \cdot 73448 \times 10^9$ s

       (vii) $5 \cdot 95 \times 10^{24}$ kg   (viii) $6 \cdot 37 \times 10^6$ m

Chapter-6 Algebraic Expression

Exercise = 6.1

1.   (i) $7 + 3x$ (ii) $11y - 22$ (iii) $\dfrac{x}{y} - 13 = 7$ (iv) $p - q = 19$

       (v) $xy + (x + y)$.   (vi) $x + 18$ (vii) $3xy + (x - y) = 17$

2.   (i)   Terms are $17x$, -7, number of terms $= 2$

       (ii) $8a - 4b + 2c$, Terms are $= 8a$, $-4b$, $2c$,

           Number of terms $= 3$

       (iii) $\dfrac{6}{a} - 2b + 3a^2 b$

           Terms or $= \dfrac{6}{a}$, $-2b$, $3a^2 b$, Number of terms $= 3$

       (iv) $pq + qr - rp$, Terms or $= Pq$, qr, $-rp$

           Number of terms $= 3$

       (v) $x^3 + y^3 + 2^3 - 3xyz$, Terms are $= x^3$, y^3, z^1, $-3xyz$, Number of terms $= 4$

       (vi) $9xy - \dfrac{y}{x} + \dfrac{12}{x} - \dfrac{8xy}{5}$, Terms are $= 9xy$, $\dfrac{y}{x}$, $\dfrac{12}{x}$, $\dfrac{8xy}{5}$, Number of terms $= 4$

3.   (i) $2xy$ and $-3xy; -4x^2 y$ and $7yx^2$

       (ii) $5x^2 yz - 4yzx^2$ and $7zyx^2$; $2y^2 x$ and $4xy^2$

       (iii) $\dfrac{2}{5} ab^2 c$, $\dfrac{-1}{3} acb^2$ (iv) $-7xy$ and $3xy$

4. (i) -3 (ii) $\dfrac{-17}{5}$ (iii) 2

5. (i) $8, x, x, x, y, y$ (ii) $-2, x, x, y, y, y, z, z$

(iii) $9, p, p, p, q, r, r$ (iv) $-6, a, a, a, b, c, c$

6. (i) $7xy$ (ii) $6y$ (iii) $7x^3 y$ (iv) $4y^2$

(v) $16x^2 y$ (vi) $7xz^3$ (viii) $16y$ (viii) 1

7. (i) $3a^2 + b = 3(2)^2 + (-1) = 3 \times 4 + (-1) = 12 + (-1) = 11$

(ii), (iii) as similar as (i), So, do your self.

(iv) $ab^2 + a^2 b = 2 \times (-1)^2 + (2)^2 \times (-1)$

$= 2 \times (-1) + 4 \times (-1) = -2 + (-4) = -6$

(v) $a + b + c = 2 + (-1) + (-2) = 1 + (-2) = 1$

Exercise = 6.2

1. (i) $6b + 7b = 13b$ (ii) $y^2 + (-6y^2) = -5y^2$ (iii) $3p^2 q + 4p^2 q = 7p^2 q$

(iv), (v) and (vi) as similar as (i) to (iii). So, do your self.

2. (i) $x - 8y + 4z + y - 2n - 8z + 5x - 2y - 3z$

$= 4x - 4y - 7z$

(ii) $2x^2 - 3y^2 + 5x^2 + 6y^2 - 3x^2 - 4y^2 = 4x^2 - y^2$

(iii) $5x - 2x^2 - 8 + 8x^2 - 7x - 9 + 3 + 7x^2 - 2x$

$= 13x^2 - 4x - 14$

3. (i) $(2x + 7y) - (4x - 5y)$

$= 2x + 7x - 4x + 5y$

$= -2x + 1xy$

(ii) $(2a + 5b - 7c) - (a - 2b + c)$

$= 2a + 5b - 7c - a + 2b - c$

$= a + 7b - 8c$

(iii) $(3a^2 + 9) - (4a^2 - 2a + 7)$

$= 3a^2 + 9 - 4a^2 + 2a - 7 = -a^2 + 2a + 2$

Exercise = 6.3

1. (i) $(a^2 + b^2 + 2ab) + (a^2 + b^2 - 2ab)$

$= (a^2 + b^2) + (b^2 + b^2) + 2ab - 2ab = 2a^2 + 2b^2$

(ii) $(a^2 + b^2 + 2ab) - (a^2 + b^2 - 2ab)$

$= a^2 + b^2 + 2ab - a^2 - b^2 + 2ab = 4ab$

(iii) $-5 (a + b) + 2 (2a - b) + 4a - 7$

$= -5a - 5b + 4a - 2b + 4a - 7$

$= (-5a + 4a + 4a) + (-5 - 2b) - 7 = 3a - 7b - 7$

(iv) $-3 (a + b) + 4 (2a - 3b) - (2a - b)$

$= -3a - 3b + 8a - 12b - 2a + b$

$= (-3a + 8a - 2a) + (-3b - 12b + b) = 2a - 14b$

(v) $2x - \{5y - (x - 2y)\} = 2n - 5y + x - 2y = 3x - 7y$

(24)

(vi) $2x-[3y-\{2x-(y-x)\}]=2x-3y+2x-(y-x)$

$\qquad =4x-3y-y+x=5x-4y$

(vii) $-m-[m+\{m+n-2m-(m-2n)\}-n]$

$\qquad =-m-m-\{m+n-2m-m+2n\}+n$

$\qquad =2\cancel{m}-\cancel{m}-n+2\cancel{m}+\cancel{m}-2n+n=-2n$

(viii) $3x^2z-4yz+3xy-\{x^2z-(x^2z-3yz)-4yz-7z\}$

$\qquad =3x^2z-4\cancel{y}z+3xy-\cancel{x^2}z+\cancel{x^2}z=-3yz+4yz+7z$

$\qquad =3x^2z-3yz+3xy+7z$

(ix) $15x-[8x^3+3x^2-\{8x^2-(4-2x-x^3-5x^3\}-2n]$

$\qquad =15x-8x^3-3x^2+8x^2-4+2x+x^3-5x^3+2x$

$\qquad =-12x^3+5x^2+19x-4$

(x) $5+[x-\{2y-(6x+y-4)+2x^2\}-(x^2-2y)]$

$\qquad =5+x-2y+6x+y=4-2x^2+x^2-2y$

$\qquad =-x^2+7x-3y+1$

(xi) $5y-[2x-3y-3\{52-2\,(x-\overline{2y-3z-2x})\}]$

$\qquad =5y-[2x-3y-10z+6\,(x-\overline{2y-3z-2x})]$

$\qquad =5y-[2x-3y-10z+6x-12y+18z+12x]$

$\qquad =5y-2x+3y+10z-6x+12y-18z-12x$

$\qquad =-20+20y-8z$

(xii) $2x-[3y-4z-3\,(x-\overline{2y-z})]$

$\qquad =2x-[3y-4z-3\,(x-2y+z)]$

$\qquad =2x-[3y-4z-3x+6y-3x]$

$\qquad =2x-3y+4z+3x-6y+3z=5x-9y+7z$

Objective Type Questions

1. (ii) **2.** (i) **3.** (iii) **4.** (i) **5.** (iv) **6.** (ii) **7.** (iv) **8.** (iii)

Fill in the blanks

1. constant **2.** three **3.** polynomial **4.** power **5.** numerical

Matching

1. (iii) **2.** (vi) **3.** (i) **4.** (v) **5.** (ii) **6.** (iv)

Chapter Assessment

1. (i) 2 (ii) $-3y$ (iii) $4y^2z$ (iv) $5y^2$ (v) xy^3z^4, **2.** (i)

Term	Numerical Coefficient
$-2x^2$	2
$-7x^2y$	-7
$5xy^2$	5
$-8z$	-8

(ii)

Term	Numerical Coefficient
$4pq$	4
$-5q^2$	-5
$-3p^2$	-3

3.

	Term	Numerical Coefficient
(i)	$8x^2, -5y$	8, x, x, -5, y
(ii)	$3z^2y, 4xy^2, -8x^3$	3, z, z, z, 4, x, y, y, -8, x, x, x
(iii)	$11xy^2, 13x^2y$	11, x, y, y, 13, x, x, y
(iv)	$9xy, -12x^2y, 17y^2$	9, x, y, -12, x, x, y, 17, y, y

4. (i) $a+6a$ (ii) a^2-3a^2 (iii) x^2-2x^2 (iv) $2x^2y-4yx^2$

(v) $-8ab^2+2ab^2$ (vi) $xyz+7xyz$

5. (i) 2   (ii) 3   (iii) 4   (iv) 3   (v) 6   (vi) 3

6. (i) $-13ab$ (ii) $2x^3+3x^2-x-1$ (iii) $6+3b+c$

(iv) $4x^3+3x^2y-y^3$ (v) $x+17x^3$

7. (i) $14ab$ (ii) x^2-2y^2+6xy (iii) $-2x-2y-z$

(iv) $3a+3b+4c$ (v) $-4m+14n-9p^2$

8. $5a^2-7ab+3b^2-a+b$ 9. $5a^2+3b^2-7ab-a+b$

10. $a=-5$ 11. 38   12. $(20x+16)\,\text{m}$ 13. $(6a+9b)\,\text{m}$

Chapter-7 Simple Equations

Exercise = 7.1

1. (i) $x-11=5$ (ii) $5a=60$ (iii) $\dfrac{p}{4}=3$

(iv) $x^2=5+x$ (v) $x+2y=30$ (vi) $3m-4=14$

(vii) $a+a^2=20$ (viii) $\dfrac{9+4}{y}=\dfrac{7}{3}$ (ix) $\dfrac{3m}{4}=m-1$

(x) $7z+8=71$

2. (i) The difference between twice a number and 6 is 24.

(ii) Adding 3 to one third of a number gives 14.

(iii) Taking away 4 from 4 times of a number gives 44.

(iv) Three fourth of Z is 15 less than itseb.

(v) Half of a number P is equal to 3.

(vi) A number 3 less than 9 times another number y is equal to 7.

3. (i) Let, the width of ground $=x$, $30+x=120$

(ii) Let, Vani's sister weight $=x$, $2x+4=50$

(iii) Let, the warden angle $= x$

base angles $= y$

$$x = 2y,$$
$$2x + y + y = 180,$$
$$2y + y + y = 180$$
$$4y = 180$$
$$y = \frac{\cancel{180}^{45}}{\cancel{4}}$$
$$y = 45$$

$45°$, $45°$, $90°$

(iv) No. of students $= 656$

Number of boys $= x$

Number of girls $= x + 86$

$$x + 86 + x = 656$$
$$2x + 86 = 656$$
$$2x = 656 - 86$$
$$2x = 570$$

(v) Let, No. of shirts Amit has $= x$, $3x - 8 = 7$

4. (i) $7x + 15 = 45$, $x = 5$ on putting $x = 5$ in showing

LHS. $7 \times 5 + 5$

$= 35 + 5 = 40 \ne 45$

$x = 5$ is not solve.

(ii) $7x + 2 = 23$; $x = 3$

LHS $7x + 2$

on putting $x = 3$

$= 7 \times 3 + 2 = 21 + 2, = 23$

RHS. $x = 3$ is solve

(iii) $\dfrac{4x}{5} + 2 = 6$; $x = 5$

LHS. $\dfrac{4x}{5} + 2 = \dfrac{4 \times \cancel{5}}{\cancel{5}} + 2$ $= 4 + 2 = 6$ $x = 5$ is solve.

(iv) $4p - 5 = 16$; $p = 7$

LHS. $4p - 5$ $= 4 \times 7 - 5$ $= 28 - 5 = 23$ $p = 7$ is not solve.

(v) $4p - 5 = 23$; $p = 7$, same as (iv)

(vi) $2x + 5 = 15$; $x = 5$

LHS. $2x + 5 = 2 \times 5 + 5 = 10 + 5 = 15$ $x = 5$ is solve.

5. (i) $2x + 4 = 8$

x	LHS	RHS	LHS = RGS
1	$2 + 4 = 6$	8	No
2	$4 + 4 = 8$	8	Yes

Hence, solve is $x = 2$

(ii) $11 + 2x = 19$

x	LHS	RHS	LHS = RGS
1	$11 + 2 = 13$	19	No
2	$11 + 4 = 15$	19	No
3	$11 + 6 = 17$	19	No
4	$11 + 8 = 19$	19	Yes

Hence, the solution is $x = 4$

(iii) $\dfrac{12}{m} = 3$

x	LHS	RHS	LHS = RGS
1	12	3	No
2	6	3	No
3	4	3	No
4	3	3	Yes

Hence, the solution is $m = 4$

(iv) $\dfrac{x}{3} + 5 = 7$

x	LHS	RHS	LHS = RGS
3	$1 + 5 = 6$	7	No
6	$2 + 5 = 7$	7	Yes

Solution is $x = 6$

6. (i) $5x - 2 = 18$ 　　　Answer Check: 　LHS. $5x - 2$

$5x = 18 + 2$ 　　　　　　　　　　$= 5 \times 4 - 2$

$5x = 20$ 　　　　　　　　　　　$= 20 - 2$

$x = 4, x = \dfrac{20}{5}$ 　　　　　　　　$= 18$

　　　　　　　　　　　　　　　　$= $ RHS.

(ii) $\dfrac{1}{4}y + \dfrac{1}{2} = 5$ 　　Answer check : 　RHS $\dfrac{y}{4} + \dfrac{1}{2}$

$\dfrac{y + 2}{4} = 5$ 　　　　　　　　　　$= \dfrac{18^{9}}{4^{2}} + \dfrac{1}{2}$

$y + 2 = 20$ 　　　　　　　　　　　$= \dfrac{9 + 1}{2}$

$y = 20 - 2$ 　　　　　　　　　　　$= \dfrac{18}{2} = 5$

$y = 18$ 　　　　　　　　　　　　$= $ RHS

(iii) $\dfrac{3}{5}x - 6 = 3$ Answer check :   RHS. $\dfrac{3}{5}x - 6$

$\qquad = \dfrac{3x - 30}{5} = 3$ $= \dfrac{3}{5} \times \overset{3}{\cancel{15}} - 6$

$\qquad 3x - 30 = 15$ $= 9 - 6$

$\qquad\quad 3x = 30 + 15$ $= 3$

$\qquad\quad 3x = 45$ $= $ RHS.

$\qquad\quad\; x = 15$

(iv) $3x - \dfrac{1}{5} = 2 - x$

$\qquad \dfrac{15x - 1}{5} = \dfrac{2 - x}{1}, \quad 15x - 1 = 10 - 5x, \quad 15x + 5x = 10 + 1,$

$\qquad 20x = 11, \qquad x = \dfrac{11}{20}$

(v) $8x + 5 = 6x - 5$

$\qquad 8x - 6x = -5 - 5, \quad 2x = -10, \; x = \dfrac{-10}{2}, \quad x = -5$

(vi) $9z - 13 = 11z + 27$

$\qquad 9z - 11z = 13 + 27, \quad -2z = 40 \quad z = \dfrac{-40}{2}, \; z = -20$

(vii) $\dfrac{7}{y} + 1 = 29$

$\qquad \dfrac{7}{y} = 29 - 1, \; \dfrac{7}{y} = 28, \quad y = \dfrac{7}{28}, \quad y = \dfrac{1}{4}$

(viii) $\dfrac{3}{5}x + \dfrac{2}{5} = 1$

$\qquad 3x + 2 = 5, \quad 3x = 5 - 2, \quad 3x = 3, \quad x = 1$

(ix) $4y - 2 = \dfrac{1}{5}$

$\qquad 4y = \dfrac{1}{5} + 2, \quad 4y = \dfrac{1 + 10}{5}, \quad 4y = \dfrac{11}{5}, \quad y = \dfrac{11}{20}$

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

$\qquad 2x + x = 48, \quad 3x = 48, \qquad x = 16$

(xi) $\dfrac{2}{5}z = \dfrac{3}{8}z + \dfrac{7}{20}$

$\qquad \dfrac{2}{5}z - \dfrac{3}{8}z = \dfrac{7}{20}, \qquad \dfrac{16z - 15z}{\cancel{40}^{2}} = \dfrac{7}{\cancel{20}} \qquad z = 2 \times 7, \qquad z = 14$

(xii) $\dfrac{2}{5}y - \dfrac{5}{8}y = \dfrac{5}{12}$

$\qquad \dfrac{16y - 25y}{\cancel{40}^{10}} = \dfrac{5}{\cancel{12}}, \quad -9y \times 3 = 50, \qquad y = -\dfrac{50}{27}$

(xiii) $3x + 2\,(x + 2) = 20 - (2x - 5)$

$3x + 2x + 4 = 20 - 2x + 5,$ $5x + 2x = 25 - 4,$ $7x = 21, x = 3$

(xiv) $13\,(y - 4) - 3\,(y - 9) = 5\,(y + 4)$

$13y - 52 - 3y + 27 = 5y + 20,$ $10y - 5y = 20 + 25,$ $5y = 45,$ $y = \dfrac{45}{5}, y = 9$

(xv) $(2z - 7) - 3\,(3z + 8) = 4z - 9$

$2z - 7 - 9z - 24 = 4z - 9,$ $-7z - 4z = -9 - 31,$ $-11z = -40, z = \dfrac{40}{11}$

(xvi) $4\,(2y - 3) + 5\,(3y - 4) = 14$

$8y - 12 + 15y - 20 = 14,$ $23y = 14 + 32,$

$23y = 46,$ $y = \dfrac{46^2}{23},$ $y = 2$

(xvii) $\dfrac{x}{2} - \dfrac{x}{3} = \dfrac{x}{4} + \dfrac{1}{2}$

$\dfrac{3x - 2x}{6} - \dfrac{x}{4} = \dfrac{1}{2},$ $\dfrac{x}{6} - \dfrac{x}{4} = \dfrac{1}{2},$ $\dfrac{2x - 3x}{12^6} = \dfrac{1}{2},$ $-n = 6,$ $n = -6$

(xviii) $z - \dfrac{2z}{3} + \dfrac{3}{2} = 5$

$\dfrac{3z - 2z}{3} = 5 - \dfrac{3}{2},$ $\dfrac{z}{3} = \dfrac{10 - 3}{2},$ $2z = 7 \times 3,$ $z = \dfrac{21}{2}$

(xix) $\dfrac{6y + 1}{2} + 1 = \dfrac{7y - 3}{3}$

$\dfrac{6y + 1 + 2}{2} = \dfrac{7y - 3}{3},$ $3\,(6y + 3) = 2\,(7y - 3),$ $18y + 9 = 14y - 6$

$18y - 14y = -6 - 9,$ $4y = -15,$ $y = \dfrac{-15}{4}$

(xx) $\dfrac{6x - 2}{5} = \dfrac{2x - 1}{3} - \dfrac{1}{3}$

$\dfrac{6x - 2}{5} - \dfrac{2x - 1}{3} = \dfrac{-1}{3},$ $\dfrac{3\,(6x - 2) - 5\,(2x - 1)}{15^5} = \dfrac{-1}{3},$

$18x - 6 - 10x + 5 = -5,$ $8x = -5 + 1,$ $8x = -4,$ $x = \dfrac{-4}{8},$ $x = \dfrac{-1}{2}$

(xxi) $\dfrac{Z - 1}{3} = \dfrac{1 + Z - 2}{4}$

$4\,(Z - 1) = 3\,(Z - 1),$ $4Z - 4 = 3Z - 3,$ $4Z - 3Z = 4 - 3,$ $Z = 1$

(xxii) $2x - 3 = \dfrac{3}{10}\,(5x - 12)$

$10\,(2x - 3) = 3\,(5x - 12),$ $20x - 30 = 15x - 36,$

$20x - 15x = 30 - 36,$ $5x = -6, x = \dfrac{-6}{5}$

(xxiii) $3\,(y - 3) = 5\,(2y + 1)$

$3y - 9 = 10y + 5,$ $3y - 10y = 9 + 5,$ $-7y = 14,$ $y = \dfrac{-14}{7},$ $y = -2$

(xiv) $0·6x + 0·8 = 0·28x + 1·16$

$0·6x - ·28x = -0·8 + 1·16,$ $\qquad$ $0·32x = 0·36,$ $\qquad$ $x = \dfrac{0·36^{9}}{0·32^{8}} = \dfrac{9}{8}$

7. (i) $5x - 3 = 3x + 5$

$5x - 3x = 3 + 5,$ $\qquad$ $2x = 8, x = 4$

(ii) $3(y - 1) = y - 11$

$3y - 3 = y - 11,$ $\qquad$ $3y - y = 3 - 11,$ $\qquad$ $2y = -8, y = -4$

(iii) $4x - \dfrac{1}{5} = 7$

$4x = 7 + \dfrac{1}{5},$ $\qquad$ $4x = \dfrac{35 + 1}{5},$ $\qquad$ $4x = \dfrac{36}{5},$ $\qquad$ $x = \dfrac{36^{9}}{20^{5}},$ $\qquad$ $x = \dfrac{9}{5}$

(iv) $\dfrac{4}{5}x - \dfrac{1}{6} = \dfrac{9}{2} - 2x$

$\dfrac{4}{5}x + 2x = \dfrac{9}{2} + \dfrac{1}{6},$ $\qquad$ $\dfrac{4x + 10x}{5} = \dfrac{27 + 1}{6},$ $\qquad$ $\dfrac{14^{4}}{5} = \dfrac{28^{2}}{6^{3}},$ $\qquad$ $x = \dfrac{5}{3}$

(v) $7 - 2(5 - 3x) = 4(x - 3) + 5$

$7 - 10 + 6x = 4x - 12 + 5,$ $\qquad$ $6x - 4x = -7 + 3,$ $\qquad$ $2x = -4, x = -2$

(vi) $\dfrac{3x - 2}{2x + 1} = \dfrac{4}{5},$

$5(3x - 2) = 4(2x + 1),$ $\qquad$ $15x - 10 = 8x + 4,$ $\qquad$ $15x - 8x = 10 + 4,$ $\qquad$ $7x = 14, x = 2$

(vii) $\dfrac{1 - x}{6} + \dfrac{2x}{3} - \dfrac{1 - 7x}{4} = 2\dfrac{1}{6}$

$\dfrac{2 - 2x + 8x - 3 + 21x}{12^{2}} = \dfrac{13}{6},$ $\qquad$ $\dfrac{27x - 1}{2} = 13,$ $\qquad$ $27x - 1 = 26,$ $\qquad$ $27x - 1 = 26,$ $\qquad$ $x = 1$

(viii) $0·6x + \dfrac{4}{5} = 0·28x + 1·6$

$0·6x - 0·28x = 1·6 - \dfrac{4}{5},$ $\qquad$ $0·32x = 1·6 - 0·8,$ $\qquad$ $0·32x = 0·8,$

$x = \dfrac{0·80}{0·32}, x = \dfrac{80^{10^{5}}}{32^{4^{2}}},$ $\qquad$ $x = \dfrac{5}{2}, x = 2·5$

Chapter-8

Exercise = 8.1

1. (i) $3:8$ $\qquad$ (ii) $24:73$ $\qquad$ (iii) $6:11$ $\qquad$ (iv) $3:12$

(v) $\dfrac{65 \text{ paise}}{5 \text{ rupees}}$

$= \dfrac{65 \text{ paise}}{5 \times 100 \text{ paise}} = \dfrac{65^{13}}{500^{100}} = 13:100$

(vi) $12 \text{ m to } 85 \text{ cm}$

$= \dfrac{12 \text{ m}}{85 \text{ cm}}$ $\qquad$ $= \dfrac{1200^{240} \text{ cm}}{85^{17} \text{ cm}} = 240:17$

2. (i) $2:5$ or $3:7$

$$= \frac{2}{5} \times \frac{7}{7} = \frac{14}{35} \qquad \frac{3}{7} \times \frac{5}{5} = \frac{15}{14} \qquad \frac{15}{14} > \frac{14}{35}$$

$\frac{3}{7}$ $3:7$ is greater

(ii) $4:5$ or $5:6$

$$\frac{4}{5} \times \frac{6}{6} = \frac{24}{30} \qquad \frac{5}{6} \times \frac{5}{5} = \frac{25}{30} \qquad \frac{25}{30} > \frac{24}{30}$$

$\frac{5}{6} > \frac{4}{5}$, $5:6$ is greater

(iii) $6:11$ or $9:14$

$$\frac{6}{11} \times \frac{14}{14} = \frac{84}{154} \qquad \frac{9}{14} \times \frac{11}{11} = \frac{99}{154}$$

$\frac{99}{154} > \frac{84}{154}$, $\frac{9}{14} > \frac{6}{11}$, $9:14$ is greater.

(iv) $1:4$ or $6:36$

$$\frac{1}{4} \times \frac{6}{36} = \frac{36}{144} \qquad \frac{6}{36} \times \frac{4}{4} = \frac{24}{144} \qquad \frac{36}{144} > \frac{24}{144}$$

$\frac{1}{4} > \frac{6}{36}$ $\quad$ $1:4$ is greater.

3. (i) $18:12 = \frac{\overset{3}{\cancel{18}}}{\underset{2}{\cancel{12}}} = 3:2$ $\qquad$ (ii) $\frac{2}{3} : \frac{5}{6} = \frac{2}{1} : \frac{5}{2} = 4:5$

(iii) $7:3\frac{1}{2} = 7:\frac{7}{2} = 14:7 = 2:1$ $\qquad$ (iv) $3\frac{1}{2} : 1\frac{3}{4} = \frac{7}{2} : \frac{7}{4} = \frac{1}{2} : \frac{1}{4} = 2:1$

4. (i) $5:7 = \frac{5}{7} \times \frac{2}{2} = \frac{10}{14} = 10:14$ $\qquad$ (ii) $3:11 = \frac{3}{11} \times \frac{2}{2} = \frac{6}{22} = 6:22$

5. $\frac{12}{20} = \frac{\boxed{3}}{5} = \frac{9}{\boxed{15}}$

6. Sum of ratios $= \frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{6+4+3}{12} = \frac{13}{12}$

I part $\left(\text{ratio } \frac{1}{2}\right) = \frac{1}{2} \div \frac{13}{12} \times 260 = \frac{1}{2} \times \frac{12}{13} \times \overset{20^{10}}{\cancel{260}} = 120$

II part $\left(\text{ratio } \frac{1}{3}\right) = \frac{1}{3} \times \frac{\overset{4}{\cancel{12}}}{\cancel{13}} \times 260 = 80$

III part $\left(\text{ratio } \frac{1}{4}\right) = \frac{1}{4} \times \frac{\overset{3}{\cancel{12}}}{\cancel{13}} \times \overset{20}{\cancel{260}} = 60$

$120, 80, 60$ Rs.

7. Length of line $= 1\,\text{m}, = 100\,\text{cm}$

Let, the first part $= x$ cm, second part $= \frac{2}{3}x$ cm

$x + \frac{2}{3}x = 100 \qquad \frac{3x + 2x}{3} = 100 \qquad 5x = 300 \qquad x = \frac{\overset{60}{\cancel{300}}}{\cancel{5}}$

$x = 60\,\text{cm} \qquad$ first part $= 60\,\text{cm},$

Second part $= \dfrac{2}{\cancel{3}} \times \cancel{60}^{20} = 40\,\text{cm}$

8. Monthly salary $= 42{,}000\,\text{Rs.}$

Income tax $= 6{,}000\,\text{Rs.}$

(i) Income to tax $= \dfrac{\cancel{42{,}000}^{7}}{\cancel{6{,}000}} = 7:1$

(ii) Income tax to income $= \dfrac{\cancel{6{,}000}}{\cancel{42{,}000}^{7}} = 1:7$

(iii) No Ans.

9. Divyank performance $= \dfrac{50}{60} = 5:6$

Rahul performance $= \dfrac{\cancel{60}^{3}}{\cancel{80}^{4}} = 3:4$

$\dfrac{5}{6} \times \dfrac{4}{4} = \dfrac{20}{24}$ $\qquad$ $\dfrac{3}{4} \times \dfrac{6}{6} = \dfrac{18}{24}$ $\qquad$ $\dfrac{20}{24} > \dfrac{18}{24}\ \dfrac{5}{6} > \dfrac{3}{4}$

Divyank performance is better.

10. Ratio of eraser and pencil $= \dfrac{\cancel{80}^{4}}{2 \times \cancel{100}^{5}} = \dfrac{\cancel{4}^{2}}{\cancel{18}^{5}} = 2:5$

11. Initial ratio $= 5:6$, Let the no. $= x$

$5 - 8\,\text{Dr.} = y$ $\qquad \dfrac{x}{y} = \dfrac{5}{6}$ $\qquad 6x = 5y$ $\qquad\qquad$ ...... (i)

$\dfrac{x-8}{y-8} = \dfrac{4}{5}$ $\qquad\qquad$ $5\,(x-8) = 4\,(y-8)$ $\qquad 5x - 40 = 4y - 32$

$5 \times \dfrac{5y}{6} - 40 = 4y - 32$ $\qquad \dfrac{25}{6}y - 40 = 4y - 32$ $\qquad \dfrac{25}{6}y - 4y = 40 - 32$

$\dfrac{25y - 24y}{6} = 8$ $\quad y = 6 \times 8$ $\quad y = 48$ $\quad 6x = 5y$ $\quad x = \dfrac{5}{6}y$ $= \dfrac{5}{\cancel{6}} \times \cancel{48}^{8}$ $\quad x = 40$

No's $40 \& 48$

12. Let the age of A $= x$, the age of B $= y$

$\dfrac{x}{y} = \dfrac{5}{7} \Rightarrow$ $\qquad 7x = 5y$ .... (i)

$\dfrac{x-8}{y-8} = \dfrac{7}{13}$

$13\,(x-8) = 7\,(y-8)$ $\qquad$ putting the value of x,

$13\left(\dfrac{5y}{7} - 8\right) = 7\,(y-8)$ $\qquad \dfrac{65y - 56}{7} = 7y - 56$

$65y - 56 = 49y - 392$ $\qquad 65y - 49y = 56 - 392$

$16y = -336$ $\qquad y = \dfrac{-\cancel{336}^{21}}{\cancel{16}}$ $\qquad y = -21$

13. Let the weight of Zince $= x$

$$\frac{30.5}{x} = \frac{5}{36} \qquad x = \frac{\cancel{30}^{6\cdot1} \times 3}{\cancel{5}}$$

$x = 6\cdot1 \times 3 = 18\cdot3 \, \text{gm}$

14. Given ratio $= 3:4:5$, sum of ratio $= 3+4+5 = 12$

No of ` 1 coins $= \dfrac{3}{12} \times 187$

15. $2A = 3B = 4C \qquad A:B:C = 2:3:4$

16. $A:B = 5:6 \ldots (i) \qquad B:C = 8:9 \ldots (ii)$

Equation ...(i) $\times 4$ & equation ...(ii) $\times 3$

$A:B = 20:24 \qquad B:C = 24:27 \qquad A:B:C = 20:24:27$

17. $x:y = 8:9 \Rightarrow \dfrac{x}{y} = \dfrac{8}{9}$

$$(7x-4y):(3x+2y) = \frac{7x-4y}{3x+2y}$$

$$= \frac{\dfrac{7x-4y}{y}}{\dfrac{3x+2y}{y}} \quad = \frac{\dfrac{7x}{y}-4}{\dfrac{3x}{y}+2} \quad = \frac{7\times\dfrac{8}{9}-4}{3\times\dfrac{8}{9}+2}$$

$$= \frac{56-36}{24+18} \quad = \frac{\cancel{20}^{10}}{\cancel{42}^{21}} \quad = 10:21$$

1. (i) 33, 44, 66, 88

$33:44 = \dfrac{33}{44} = \dfrac{3}{4} = 3:4 \qquad 66:88 = \dfrac{\cancel{66}^3}{\cancel{88}^4} = \dfrac{3}{4} = 3:4$

$33:44 = 66:88$ proportion.

(ii) 46, 69, 69, 46

$46:69 = \dfrac{\cancel{46}^2}{\cancel{69}^3} = \dfrac{2}{3} = 2:3 \qquad 69:46 = \dfrac{\cancel{69}^3}{\cancel{46}^2} = \dfrac{3}{2} = 3:2$

Not proportion.

(iii) 72, 84, 186, 217

$72:84 = \dfrac{\cancel{72}^6}{\cancel{84}^7} = 6:7 \qquad 186:217 = \dfrac{\cancel{186}^2}{\cancel{217}^{31}}$

not proportional.

2. (i) $x:19::142:7$

$19 \times 142 = x \times 7 \qquad x = \dfrac{19 \times 142}{7} \qquad x = \dfrac{2698}{7}$

(ii) $21:35::33:x$

$21 \times x = 35 \times 33 \qquad x = \dfrac{\cancel{35}^5 \times \cancel{33}^{11}}{\cancel{21}^3} \qquad x = 55$

(iii) $196 : x :: x : 1$

$x \times x = 196 \times 1$ $x^2 = 196$ $x = \sqrt{196}$ $x = 14$

3.   (i) $\dfrac{1}{4} \, \& \, \dfrac{1}{36}$

$x^2 = \dfrac{1}{4} \times \dfrac{1}{36}$ $x = \sqrt{\dfrac{1}{4} \times \dfrac{1}{36}}$ $= \dfrac{1}{2} \times \dfrac{1}{6}$ $x = \dfrac{1}{12}$

(ii) 3.6 & 0.9

$x^2 = 3.6 \times 0.9$ $x = \sqrt{3.6 \times 0.9}$ $= \sqrt{36 \times 0.09}$ $= 6 \times 0.3$ $x = 1.8$

4.   Let the third pro $= x$

$4, 12, 12 \, x$ $4 \times x = 12 \times 12$ $x = \dfrac{12 \times \cancel{12}^3}{\cancel{4}}$ $x = 36$

1000 m,   500m, nm,   300 m $\cancel{500} \times n = \cancel{1000}^2 \times 300$ $x = 600 \, \text{m}$

5.   (i) $8, 36, 6, x$

$8 \times x = 36 \times 6$ $x = \dfrac{\cancel{36}^9 \times \cancel{6}^3}{\cancel{8}^2}$ $x = 27$

(ii) $5, 7, 30, x$

$5x = 7 \times 30$ $x = \dfrac{7 \times \cancel{30}^6}{\cancel{5}}$ $x = 42$

(iii) $2.8, 14, 3.5, x$

$2.8 \times x = 14 \times 3.5$ $x = \dfrac{\cancel{14} \times 3.5}{\cancel{2.8}}$ $x = 14.5$

6.   Let the also is x

$(23 - x)(108 - x) = (40 - x)(57 - x)$

$2484 - 23x - 108x + \cancel{x^2} = 2280 - 40x - 57x + x^2$

$-131x + 97x = 2280 - 2484$ $-34x = -204$ $x = \dfrac{\cancel{-204}^6}{\cancel{-34}}$ $x = 6$

7.   2 cm = 100 km

1 cm $= \dfrac{100}{2}$ km $= 50 \, \text{km}$ 5 cm $= 5 \times 50$ km $= 250 \, \text{km}$

8.   Let the also $d^r = x + 12$

$d^2 = x$

$\dfrac{x + 12}{x - 2} = \dfrac{1}{2}$ $2(x + 12) = x - 2$ $2x + 24 = x - 2$ $2x - x = -24 - 2$

$d^r = x = -26$ $0^r = x + 12$ $= -26 + 12$ $= -14$

Original fractions $= \dfrac{-26}{-14} = \dfrac{26}{14}$

Exercise = 8.3

1.   Cost of 20 chocolates $= 340 \, \text{Rs}$

Cost of 1 chocolates $= \dfrac{\cancel{340}^{17}}{\cancel{20}} = 17 \, \text{Rs}$

Cost of 35 chocolates $= 17 \times 35$
$$= 595 \, \text{Rs.}$$

2. Distance taken by 15 lit $= 150 \, \text{km}$

Distance taken by 1 lit $= \dfrac{\cancel{150}^{10}}{\cancel{15}} = 10 \, \text{km}$

Distance taken by 90 lit $= 90 \times 10 = 900 \, \text{km}$

3. Earns money in 15 days $= 7500 \, \text{Rs}$

Earns money in 1 days $= \dfrac{\cancel{7500}}{\cancel{15}} = 500 \, \text{Rs}$

Earns money in 28 days $= 28 \times 500 = 14000 \, \text{Rs}$

4. Shadow of 5 m height $= 7.5 \, \text{m}$

Shadow of 1 m height $= \dfrac{\cancel{7.5}^{1.5}}{\cancel{5}} = 1.5 \, \text{m}$

Height of the building $= \dfrac{97.5}{1.5} = 65 \, \text{m}$

5. Do it yourself.

6. Paid of 15 days $= 1815 \, \text{Rs}$

Paid of 1 days $= \dfrac{1815}{15} = 121 \, \text{Rs}$

Paid of 8 days $= 8 \times 121 = 968 \, \text{Rs}$

7. Cost of 15 envelopes $= 37.50 \, \text{Rs}$

Cost of 1 envelopes $= \dfrac{37.50}{15} = 2.5 \, \text{Rs}$

Cost of 20 envelopes $= 20 \times 2.5 = 50 \, \text{Rs}$

No. of envelopes $= \dfrac{300}{2.5} = 150$

8. Colonies in 20 grams cheque $= 90$

Colonies in 1 grams cheque $= \dfrac{90}{20} = 4.5$

Colonies in 70 grams cheque $= 4.5 \times 70 = 315$

9. Charges of 2 hours $= 62 \, \text{Rs}$

Charges of 1 hours $= \dfrac{62}{2} = 31 \, \text{Rs}$

Changes of 18 hours $= 18 \times 31 = 558$

10. Computers for 6 students $= 63$

Computers for 1 students $= \dfrac{\cancel{3}}{\cancel{6}^2}$

Computers for 24 students $= \dfrac{1}{2} \times 24 = 12$

11. 8 men dig a well $= 18 \, \text{days}$

1 men dig a well $= \dfrac{\cancel{18}^{9}}{\cancel{8}_4} \, \text{days}$

(36)

$$12 \text{ men dig a well} = \cancel{12}^{\;3} \times \frac{9}{4}$$

$$= 27 \text{ days}$$

12. Do it yourself.

Chapter-9 : Percentage, Profit and Loss, Simple Interest

Exercise = 9.1

1. (i) $2\frac{3}{4} = \frac{11}{4}$

$$= \frac{11}{4} \times \frac{100}{100} = \left(\frac{11}{\cancel{4}} \times \cancel{100}^{\;25}\right) \times \frac{1}{100} = 275\%$$

(ii) $6\frac{1}{2} = \frac{13}{2}$

$$= \frac{13}{2} \times \frac{100}{100} = \left(\frac{13}{\cancel{2}} \times \cancel{100}^{\;50}\right) \times \frac{1}{100} = 650\%$$

(iii) $\left(\frac{1}{5} \times \frac{100}{100}\right)$

$$= \left(\frac{1}{\cancel{5}} \times \cancel{100}^{\;20}\right) \times \frac{1}{100} = 20\%$$

(iv) $\left(\frac{4}{\cancel{20}} \times \cancel{100}^{\;5}\right) \times \frac{1}{100} = 35\%$

(v) $2\frac{1}{4} = \frac{9}{4}$

$$= \left(\frac{9}{\cancel{4}} \times \cancel{100}^{\;25}\right) \times \frac{1}{100} = 225\%$$

(vi) $\left(\frac{44}{\cancel{100}} \times \cancel{100}\right) \times \frac{1}{100} = 94\%$

2. (i) $0.34 = \frac{0.34}{100} = 34\%$ (ii) $2.3 = \frac{2.3}{10} = \frac{23}{100} \times 10 = 230$

(iii) $0.2 = \frac{0.2}{10} = \frac{2}{100} \times 10 = 20\%$ (iv) $0.029 = \frac{0.029}{1000} = \frac{29}{100} \times \frac{1}{10} = \frac{29}{10}\% = 2.9\%$

(vi) $0.009 = \frac{0.009}{1000} = \frac{9}{100} \times \frac{1}{10} = \frac{9}{10}\% = 0.9\%$

3. (i) $\frac{2.5}{10} = \frac{25}{100} \times 10 = 250\%$

(ii) $12:5 = \left(\frac{12}{\cancel{5}} \times \cancel{100}^{\;20}\right) \times \frac{1}{100} = 240\%$

(iii) $13:50 = \left(\frac{13}{\cancel{50}} \times \cancel{100}^{\;2}\right) \times \frac{1}{100} = 26\%$

(iv) $4:20 = \left(\frac{4}{\cancel{20}} \times \cancel{100}^{\;5}\right) \times \frac{1}{100} = 20\%$

(v) $17:25 \left(\dfrac{17}{\cancel{25}} \times \cancel{100}^{4}\right) \times \dfrac{1}{100} = 68\%$

(vi) $35:10 = \left(\dfrac{35}{\cancel{10}} \times \cancel{100}^{10}\right) \times \dfrac{1}{100} = 350\%$

(vii) $2.25\% = \dfrac{\cancel{2.25}^{9}}{\cancel{1000}_{400}} = \dfrac{9}{400}$

4.   (i) $55\% = \dfrac{\cancel{55}^{11}}{\cancel{100}_{20}} = \dfrac{11}{20}$ (ii) $46\% = \dfrac{\cancel{46}^{23}}{\cancel{100}_{50}} = \dfrac{23}{50}$

    (iii) $475\% = \dfrac{\cancel{47.5}^{95\ 19}}{\cancel{1000}_{200\ 40}} = \dfrac{19}{40}$ (iv) $160\% = \dfrac{\cancel{160}^{8}}{\cancel{100}_{5}} = \dfrac{8}{5}$

    (v) $8\dfrac{1}{3}\% = \dfrac{25}{3}\% = \dfrac{25}{3 \times \cancel{100}^{4}} = \dfrac{1}{12}$

5.   (i) $33\% = \dfrac{33}{100} = 0.33$ (ii) $1.2\% = \dfrac{1.2}{100} = 0.012$

    (iii) $3.25\% = \dfrac{3.25}{100} = 0.0325$ (iv) $0.75\% = \dfrac{0.75}{100} = 0.0075$

    (v) $145\% = \dfrac{145}{100} = 1.45$ (vi) $200\% = \dfrac{200}{100} = 2.0$

6.   (i) $4\% = \dfrac{\cancel{4}^{}}{\cancel{100}_{50\ 25}} = 1:25$ (ii) $5\dfrac{1}{4}\% = \dfrac{21}{4}\% = \dfrac{\cancel{20}}{4 \times \cancel{100}_{5}} = 21:400$

    (iii) $32\% = \dfrac{\cancel{32}^{8}}{\cancel{100}_{25}} = 8:25$ (iv) $6\dfrac{2}{3}\% = \dfrac{20}{3}\% = \dfrac{\cancel{20}}{3 \times \cancel{100}_{5}} = 1:15$

    (v) $0.36\% = \dfrac{\cancel{0.36}^{9}}{\cancel{10000}_{2500}} = 9:2500$ (vi) $0.005\% = \dfrac{\cancel{0.005}}{\cancel{100000}_{20000}} = 1:20000$

Exercise = 9.2

1.   (i) $\text{Percentage} = \dfrac{1}{4} \times 100^{25} = 25\%$ (ii) $\text{Percentage} = \dfrac{4}{8} \times 100^{50} = 50\%$

    (iii) $\text{Percentage} = \dfrac{4}{6}^{2}_{3} \times 100 = \dfrac{200}{3}\%$ (iv) $\text{Percentage} = \dfrac{2}{6}_{3} \times 100 = \dfrac{100}{3}\%$

    (v) $\text{Percentage} = \dfrac{1}{3} \times 100 = \dfrac{100}{3}\%$

2.   (i) $15\% \text{ of } 200 \text{ m} = \cancel{200} \times \dfrac{15}{\cancel{100}} = 30\%$ (ii) $24\% \text{ of } 500 \text{ kg} = \cancel{500} \times \dfrac{24}{\cancel{100}} = 120\%$

    (iii) $5\dfrac{1}{2}\% \text{ of } 1200 \text{ Rs} = \cancel{1200}^{600} \times \dfrac{11}{\cancel{2}} = 6600\%$

    (iv) $4\% \text{ of } 50\ l = \cancel{50} \times \dfrac{4}{\cancel{100}_{2}} = 2\%$ (v) $75\% \text{ of } 40 \text{ km} = \cancel{240} \times \dfrac{\cancel{75}^{15}}{\cancel{5100}} = 30\%$

    (vi) $65\% \text{ of } 540 = \cancel{540} \times \dfrac{\cancel{65}^{15}}{\cancel{100}_{2}} = 27 \times 15 = 405\%$

3. (i) 15 of 45 $= \dfrac{\cancel{15}}{\cancel{45}_3} \times 100 = \dfrac{100}{3}$ %

(ii) 25 paise of 10 $= \dfrac{25}{1000} \times 100 = 2.5$%

(iii) $\dfrac{300\,gm}{6\,kg} \times 100 = \dfrac{300}{\cancel{6000}_2} \times \cancel{100}^{5} = 5$%

(iv) 18 hrs of 4 days $= \dfrac{18^3}{4 \times \cancel{24}^4} \times \cancel{100}^{25} = \dfrac{75}{4}$ %

(v) $3\dfrac{1}{2}$ m of $4\dfrac{1}{5}$ m $= \dfrac{\cancel{7}}{\cancel{2}} \times \dfrac{5}{\cancel{21}_3} \times \cancel{100}^{50} = \dfrac{250}{3}$ %

(vi) 90 cm of 1.5 m $= \dfrac{\cancel{90}}{\cancel{150}} \times \cancel{100}^{20} = 60$%

4. (i) Let total $= x$

$x \times \dfrac{7}{100} = 126 \qquad x = \dfrac{\cancel{126} \times 100}{\cancel{7}} \qquad x = 1800 \qquad 1800 \times \dfrac{30}{100} \qquad = 540$

(ii) $x \times \dfrac{11}{100} = 176$

$x = \dfrac{176 \times 100}{11} \qquad x = 1600 \qquad 1600 \times \dfrac{72}{\cancel{100}} = 16 \times 72 = 1152$

(iii) 5% of 48% is 216

$x \times \dfrac{48}{100} = 216 \qquad x = \dfrac{\cancel{216}^{18} \times \cancel{100}^{25}}{\cancel{48}^4} \qquad x = 450 \qquad 450 \times \dfrac{\cancel{5}}{\cancel{100}^2} = \dfrac{40}{2}$

(iv) $x \times \dfrac{90}{100} = 1890 \qquad x = \dfrac{\cancel{1890}^{21} \times 100}{\cancel{90}} \qquad x = 210 \qquad 210 \times \dfrac{\cancel{15}^{3}}{\cancel{100}_2} = \dfrac{63}{2}$

5. (i) $\dfrac{\cancel{60}^{10}}{\cancel{600}} \times \cancel{100} = 10$% (ii) $\dfrac{50}{\cancel{250}_5} \times \cancel{100}^{20} = 20$%

(iii) $\dfrac{\cancel{8}}{2 \times \cancel{24}^3} \times \cancel{100}^{50} = \dfrac{50}{3}$ % (iv) $\dfrac{\cancel{1250}^{50}}{2.5 \times 1000} \times 100 = 50$%

6. (i) $x = \dfrac{\cancel{72}^{18} \times 100}{\cancel{4}} = 1800$ (ii) $x = \dfrac{64 \times \cancel{100}^4 \times 2}{\cancel{25}} = 64 \times 8 = 512$

(iii) $x = \dfrac{\cancel{6}^3 \times \cancel{100}^{25}}{\cancel{8}^4} = 75$

7. 10% more than 90 $= \dfrac{\cancel{10}}{\cancel{100}} \times \cancel{90} = 9$ Rs.

8. 20% less than 60 $= \dfrac{\cancel{20}}{\cancel{100}_5} \times \cancel{60}^{12} = 12$ Rs.

9. Rahul get the money $= \dfrac{\cancel{2}}{\cancel{10}^5} \times \cancel{500}^{100} = 100$ Rs.

% $= \dfrac{\cancel{100}^{20}}{\cancel{500}} \times \cancel{100} = 20$%

(**39**)

Sonu get the money $= \dfrac{3}{50} \times 100 = \dfrac{3}{10} \times 500\% = 150\,\text{Rs.}$

$\% = \dfrac{\cancel{150}^{\,30}}{\cancel{500}} \times 100 = 30\%$

10. Seeta get are check $= 20 \times \dfrac{20}{100} = 4$

Geeta get are check $= 20 \times \dfrac{80}{100} = 16$

11. Students were spices $= \dfrac{20}{\cancel{100}_5} \times \cancel{45}^{9} = 9$

Students do net were spices $= 45 - 9 = 36$

12. No. of eggs are notten $= \cancel{60}^{20} \times \dfrac{50 \times \cancel{100}}{3 \times \cancel{100}} = 10$

13. No. of waters who did not note $= \cancel{15000} \times \dfrac{40}{100} = 6000$

40% did not water.

14. Salary $= 400 \times \dfrac{100}{10} = 4000$

15. Sames the money $= 15000 - 8200 = 6800$

$\% = \dfrac{6800}{15000} \times 100 = \dfrac{\cancel{680}^{\,136}}{\cancel{15}_{\,3}} = \dfrac{136}{3}\%$

16. Let the original price $= x$

Reduced price $= 245.10$

$x - x \times \dfrac{14}{100} = 245.10 \qquad 100x - 14x = 24510 \qquad 86x = 24510 \qquad x = \dfrac{\cancel{24510}^{\,1225}}{\cancel{86}_{\,43}}$

$x = \dfrac{1225}{43}$

17. Let No. of students $= x$

$x \times \dfrac{40}{100} = 480 \qquad x = \dfrac{480 \times 100}{40} \qquad x = 1200$

18. $\%$ increasing $= \dfrac{1}{5} \times \cancel{100}^{\,20} = 20\%$

19. $\%$ of price gone up $= \dfrac{47}{1} \times 100 = 4700\%$

Exercise = 9.3

1. (i) C.P = 5550   S.P. = 6070

     Profit = 6070 – 5550 = 520 Rs.

  (ii) C.P = 7670   S.P. = 7000

     Loss = 7670 – 7000 = 670

(iii) C.P = 593   S.P. = 600

     Profit = 600 – 593 = 7 Rs.

(iv) C.P = 2600   S.P. = 2300

Loss = 2600 − 2300 = 300 Rs.

2. (i) CP = 24,   Profit = 4

$$\% = \frac{\cancel{4}}{\cancel{24}_{6_3}} \times \cancel{100}^{50} = \frac{50}{3}\%$$

(ii) CP = 840 Rs.   Profit = 36 Rs.

$$\% = \frac{\cancel{36}^{3}}{\cancel{840}_{7}} \times 100 = \frac{30}{7}\%$$

(iii) CP = 150,   Loss = 12

$$\% = \frac{\cancel{12}^{4}}{\cancel{150}_{3}} \times \cancel{100}^{2} = 8\%$$

(iv) CP = 230,   Loss = 8

$$\% = \frac{8}{\cancel{230}} \times 100 = \frac{80}{23}\%$$

3. (i) $$\% = \frac{\cancel{260}}{\cancel{2600}} \times 100 = 10\%$$

(ii) $$\% = \frac{146}{\cancel{3650}_{53}} \times \cancel{100}^{2} = \frac{146}{53}\%$$

4. C.P. = 1500 + 100 = 1600 Rs.

S.P. = 150 × 1.20 = 800 Rs.

$$\% \text{ of gain} = \frac{\cancel{200}}{\cancel{1600}} \times \cancel{100}^{25} = \frac{28}{2}\% = 12.5\%$$

5. $$\% \text{ of profit} = \frac{\cancel{2}}{\cancel{8}_4} \times \cancel{100}^{25} = 25\%$$

6. C.P. of 3600 bananas = 300 × 16 = 4800

S.P. = 1850 × 2 = 3700 Rs.

= 3700 + 2800 = 6500

Profit = S.P. − C.P. = 6500 − 4800 = 1700 Rs.

$$\% = \frac{\cancel{1700}}{\cancel{4800}} \times 100 = \frac{17 \times 100}{48} = 35.42\%$$

7. C.P. = 50 Rs.   S.P. = $\frac{\cancel{96}^{8}}{\cancel{12}} \times 8.50 = 68$

Profit = 68 − 50 = 18

$$\% = \frac{18}{\cancel{50}} \times \cancel{100}^{2} = 36\%$$

8. Let the cost of a books = x

C.P. = 15x S.P. of = 1 book = $\frac{15x}{12}$ $\% = \dfrac{\dfrac{15x}{121} \times 100}{\cancel{x}} = 125\%$

9. C.P. = 10000 Rs.   % = 20%   S.P. = $10000 + \dfrac{\cancel{20} \times 2000}{\cancel{100}_{5}} = 12000$ Rs.

10. S.P. = 1332 Rs.   % = 7.5%   C.P. $= 1332 - \dfrac{7.5 \times 1332}{100}$

$= 1332 - 99.90 = 1232.1$

11. (i) C.P. = 750 Rs.

   14%   S.P $= \dfrac{750 + 14 \times 750}{100} = 750 + 105.00 = 855$ Rs.

   (ii) 6% Loss

   S.P. $= 750 - \dfrac{6 \times 750}{100} = 750 - 45 = 705$ Rs.

12. Let,   C.P. = x Rs.   % = 15%

   C.P. $= 600 - x \times \dfrac{15}{100}$

   $10x = 60000 - 15x$ $100x + 15x = 60000$ $115x = 60000$

   $x = \dfrac{60000}{115}$ $x = 511.74$ Rs.

13. C.P. = 24 × 450 = 10800 Rs.

   S.P. = 16 × 600 + 8 × 400 = 9600 + 3200 = 12800 Rs.

   Profit = 12800 – 10800 = 2000 Rs.

   % $= \dfrac{200}{10800} \times 100 = 18.5\%$

14. S.P. = 3220 Rs.   Gain $= \dfrac{1}{6}x$

   $x = 3220 - \dfrac{1}{6}x$ $6x = 19320 - x$ $7x = 19320$ $x = 2760$

   % $= \dfrac{\dfrac{1}{6}x}{x} \times 100 = 16.6\%$

15. S.P. = 1080 Rs.   C.P. = x Loss = 10%

   C.P. $= 1080 + 080 \times \dfrac{10}{100} = 1108$ Rs.

   S.P. $= 1108 + 1108 \times \dfrac{25}{4} \times 100^4 = 1108 + 69.25 = 1177.25$ Rs.

16. S.P. = 600 Rs.

   Let, S.P. of one bed sheet = x

   S.P. of IInd bed sheet = $600 - x$

   Gain = 20%   C.P. $= x - x \times \dfrac{20}{100^5} = \dfrac{4x}{5}$

   Loss = 25%   C.P $= (600 - x)$

Exercise = 9.4

1.   (i) S.I. $= \dfrac{R}{100} \times T \times P = \dfrac{5}{100} \times 5 \times 2000 = 25 \times 20 = 500$ Rs.

(**42**)

(ii) $\text{S.I.} = 500 \times 4 \times \dfrac{12.4}{100} = 20 \times 12.5 = 250$

(iii) $\text{S.I.} = \dfrac{4^2}{100} \times 4500 \times \dfrac{1}{2} = 90\,\text{Rs.}$

(iv) $\text{S.I.} = 12000 \times \dfrac{1}{3} \times \dfrac{18^6}{100} = 720\,\text{Rs.}$

2. (i) $R = \dfrac{S.I. = 100}{T \times P} = \dfrac{1100 \times 100}{2 \times 8250} = \dfrac{11000}{2 \times 825} = 26.6\%$

(ii) $R = \dfrac{975 \times 100 \times 2}{5200 \times 5} = \dfrac{1950}{260} = 7.5\%$

3. (i) $T = \dfrac{S.I. \times 100}{R \times P} = \dfrac{800 \times 100}{5 \times 8000} = 2\,\text{years}$ (ii) $T = \dfrac{250^5 \times 100}{4000 \times 5} = \dfrac{5}{4}\,\text{years}$

4. $T = \dfrac{^{40}600 \times 100}{6^3 \times 1500} = \dfrac{20}{3}\,\text{years}$

5. $P = 5500\,\text{Rs}$ $R = 12\%$ $T = \dfrac{72}{365}$

$\text{S.I.} = \dfrac{R}{100} \times P \times T = \dfrac{12}{100} \times 5500 \times \dfrac{72}{365} = 130.19$

Total money $= 5500 + 130.19 = 5630.19\,\text{Rs.}$

6. $\text{S.I.} = \dfrac{R}{100} \times P \times T = \dfrac{8}{100} \times 4500 \times \dfrac{73}{65} = 72\,\text{Rs.}$

7. $P = ?$

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

$P = \dfrac{S.I. \times 100}{RT} = \dfrac{5525 \times 100}{10 \times 3} = \dfrac{55250}{3}$

$P = 18416.6$

8. $\text{S.I.} = 3P$ $\text{S.I.} = \dfrac{R}{100} \times P \times T$ $3P = \dfrac{R}{100} \times P \times 16$

$R = \dfrac{3 \times 100}{10}$ $R = 18.75\%$

9. $T = 2\,\text{years},$ $A = 5434\,\text{Rs.}$ $R = \dfrac{9}{4}\%$ $P = ?$

$\text{S.I.} = \dfrac{R}{100} \times P \times T$ $5434 - P = \dfrac{9}{4 \times 100} \times P \times 2$

$(5434 - P)\,400 = 18P$ $5434 \times 400 = 400P + 18P$

$418P = 5434 \times 400$ $P = \dfrac{5434 \times 400}{418}$ $P = 5200\,\text{Rs.}$

10. $R = \dfrac{S.I. \times 100}{R \times T} = \dfrac{= \dfrac{1}{4} \times P \times 100}{P \times 1}$ $P = 25\%$

$$S.I. = \frac{25}{100} \times 60000 \times 2 = 50 \times 600 = 30000$$

$$A = P + S.I. = 60000 + 30000 = 90000$$

11. $P = \dfrac{S.I. \times 100}{R \times T} = \dfrac{4230 \times 100 \times 2}{7 \times 5}$

$P = 24171.43 \, \text{Rs.}$

12. $P = 12000 \, \text{Rs.}$

$$S.I. = \frac{18}{100} \times 2000 \times 3 + 10,000 \times \frac{15}{100} \times 3$$

$$= 18 \times 60 + 4500 = 1080 + 4500 = 5580 \, \text{Rs.}$$

13. $P = 12000 \, \text{Rs.}$

$$\text{S.I.} = \frac{8}{100} \times 12000 \times 6 = 8 \times 120 \times 6 = 5760 \, \text{Rs.}$$

$5760 = $ cost of T.V. $+ 15000 - 12000$

Cost of T.V. $= 5760 - 3000 = 2760 \, \text{Rs.}$

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

$$= \frac{50}{100} \times 100 \times \frac{1}{2} = 300 \, \text{Rs.}$$

15. Ist condition

S. I. = 96 Rs   T = 34 Rs.   R = 8%

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

Chapter-10 : Understanding Elementary Shapes

Exercise = 10.1

1. (i) $90 - 25 = 65°$ (ii) $90 - 69° = 21°$

    (iii) $90 - 45 = 45°$ (iv) $90 - 80 = 10°$

2. (i) $180 - 90 = 90°$ (ii) $180 - 105 = 75$

    (iii) $180 - 158 = 22°$ (iv) $180 - 110° = 70°$

3. (i) $67° + 23 = 90°$ complementary   (ii) $153 + 17 = 180$, supplementary.

    (iii) $1 + 07 + 73 = 180$, Supplementary.   (iv) $68 + 22 = 90$ complementary.

    (v) $125 + 55 = 180$ supplementary.   (vi) $42 + 48 = 90°$ complementary.

4. (i) 1 and 2 are adjacent

    (ii) 1 and 2 are adjacent.

    (iii) 1 and 2 are not adjacent

    (iv) 1 and 2 are not adjacent.

5. (i) and (ii) linear $140 + 40 = 180°$

6. (i) b c z obtuse angles remain greater than 90° and linear angle is 180°.

    (ii) b c z acute angles remain less than 90° and supplementary angle is 180°

    (iii) b c z right angles said to be 90° so sum of true right angles is 180°.

7. Let the angles x and $(180 - x) y$

$$x - y = 92$$
$$\underline{x + y = 180}$$
$$2x = 272$$
$$x = 136$$
$$136 + y = 180$$
$$y = 180 - 136$$
$$\underline{y = 44°}$$

44° , 136°

8. Let the Ist angle $= x$

IInd angle $= x + 54°$

$x + x + 54 = 180 \qquad 2x = 180 - 54 \qquad 2x = 126, x = 63 \qquad x + 54 = 63 + 54 = 117$

63° , 117°

9. ratio $= 5 : 4$

$5x + 4x = 180 \qquad 9x = 180, x = 20 \qquad 5x = 5 \times 20 = 180 \quad 4x = 4 \times 20 = 80$

100, 80.

10. Let the angle $= x$

$x + x = 180 \qquad 2x = 180 \qquad x = 90°.$

11. (i) $x = 75$

$x + y = 180 \qquad 75 + y = 180 \qquad y = 180 - 75 \qquad y = 105°$

(ii) $y = 110° \qquad x = ?$

$x + y = 180 \qquad 110 + x = 180 \qquad x = 180 - 110 \qquad x = 70°$

12. $\angle POT = 75° \qquad\qquad a, b, c = ?$

$2C = a \qquad\qquad ... (i)$
$2C = 75 + b \qquad ...(2)$
$4b = a \qquad\qquad ...(3)$
$4b + 75 + b = 180 \qquad 5b = 180 - 75 \qquad 5b = 105, b = 21°.$
$4b = a \qquad a = 4 \times 21 \qquad a = 82°$
$2C = a \qquad C = a/2 \qquad C = 82/2 \qquad C = 41°$

13. (i) $2x + 4x = 180$

$6x = 180 \qquad x = 180/6 \qquad x = 30$

(ii) $4x + x = 180$

$5x = 180 \qquad x = \dfrac{180^{36}}{5} \qquad x = 36$

14. $\angle AOB = 65 \qquad \angle BOC = 115° \qquad \angle COD = 100$

(i) $\angle AOD = ?$

$\angle AOB + \angle BOC + \angle COD + \angle AOD = 360°$
$65 + 115 + 100 + \angle AOD = 360$
$\angle AOD = 360 - 280 = 80$

(ii) $\angle AOC = \angle AOB + \angle BOC = 65 + 115°, = 180 \, \text{Yes}$

(iii) $\angle BOD = \angle BOA + \angle AOD = 65 + 80 = 145 \, \text{No}$

(iv) $\angle AOD = 100°, \text{No} \qquad \angle DOA = 80, \text{No.}$

(45)

15. (i) $\angle AOD$ and $\angle EOC$ (ii) $\angle AOB$ and $\angle BOC$

    (iii) $\angle BOE$ and $\angle EOD$ (iv) $\angle AOB$ and $\angle AOD$

    (v) $\angle AOE$ and $\angle EOD$

Exercise = 10.2

1. (i) $\angle 2$ and $\angle 8 \rightarrow$ corresponding   (ii) $\angle 3$ and $\angle 7 \rightarrow$ alternate interior

    (iii) $\angle 1$ and $\angle 8 \rightarrow$ co-interior   (iv) $\angle 4$ and $\angle 8 \rightarrow$ interion alternate

    (v) $\angle 2$ and $\angle 6 \rightarrow$ enterion alternate   (vi) $\angle 1$ and $\angle 7 \rightarrow$ corresponding

2. From the figure

    $x° = Z°$ (corresponding)

    $\angle Z° = 50°$ (alternate interion)

    $x° = 50°$ $\angle y° = 60°$

3. (i) $x = 80°$ (alternate interion)   (ii) $x = 100°$ (corresponding)

    (iii) $x = 90°$ (co-interion)

4. $\angle 1 = 75$ $\angle 5 = ?$ $\angle 8 = ?$ $\angle 1 = \angle 5$ (alternate enterior),

       $\angle 5 = 75$

    $\angle 5 + \angle 8 = 180$ (linear)

    $\angle 8 = 180 - 75$

    $\angle 8 = 105$

5. $\angle 1 = 65°$ (alternate intenion),

    $\angle 2 = 48°$ $\angle 1 + \angle 2 = a$ $a = 65 + 48$ $a = 113°$

6. To show,   G.L. $||$ HM.

    Prove$\rightarrow$ $AB \;||\; CD$,

          $\angle LGB = \angle MHD$ (corresponding)

    $\angle EGL = \angle LGB$ $\angle GHM = \angle MHD$

    $\angle EGL = \angle MHD - \angle LGB = \angle GHM$,

    Hence, $GL \;||\; HM$ Proved.

7. $\angle 2 = \angle 4$ $\angle 1 = \angle 3$

    $\angle 2 + 75 = 180$ $\angle 2 = 180 - 75$ $\angle 2 = 105°$ $\angle 4 = 105°$

    $\angle 4 + \angle 3 = 180$ $\angle 3 = 180 - 105$ $\angle 3 = 75°$ $\angle 1 = 75$

8. $AB \;||\; CD$ $EF \;||\; GH$

    Hence ABCD is a perallehoghram

       $\angle x = \angle y$ $\angle x = 80°$ $\angle y = 80°$

9. (i) $\angle 1 = 22, 60 = 60$ (alternate interior)

      Hence $l \;||\; m$

    (ii) $\angle 1 + \angle 4 = 180$

         $\angle 4 = 180 - 140$

            $= 40°$

      $\angle 4 = \angle 2$

      Hence, $l \;||\; m$
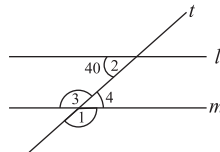
(iii) l is not parallel to m.

(iv) $\angle 4 + \angle 1 = 180$

$\qquad \angle 4 = 180 - 67$

$\qquad \angle 4 = 113$

$\qquad \angle 4 = \angle 3$

Hence $l \parallel m$

10. $\angle GEF = 58$

(i) $\angle ABC = \angle DEC = GER \qquad \angle ABC = 58°$

(ii) $\angle DGC = 58°$

(iii) $\angle EGC + \angle DGC = 180$

$\qquad \angle EGC = 180 - 58 = 122$

11. Show $AB \parallel EF$

$\angle ABC = 60° \qquad \angle FEC = 150° \qquad\qquad \angle ECD = 30°$

$\angle ECB = 30° \qquad\quad \angle ABC = \angle BCD \qquad AB \parallel CD \qquad\qquad AB \parallel EF$

12. $\angle 2 = 120° \qquad \angle 5 = 60°$

$\angle 5 + \angle 8 = 180 \qquad\quad \angle 8 = 180 - 60 \qquad \angle 8 = 120 \qquad \angle 8 = \angle 2\, m \parallel n$

Chapter-11 : Properties of Triangles

Exercise = 11.1

1.　　(i)　line-segment, mind point　　　　　(ii)　medium

　　(iii)　interior　　　　　　　　　　　　(iv)　centroid

　　(v)　altitude perpendicular　　　　　(vi)　orthocentre

　　(vii)　vertex of the right angle.

2.　　(i)　$x + 70° + (180 - 100) = 180°$

　　　　$x + 70 + 80 = 180 \qquad x = 180 - 150 \qquad x = 30$

　　(ii)　$x + 30 + (180 - 80) = 180$

　　　　$x + 30 + 100 = 180 \qquad x = 180 - 130 \qquad x = 50$

　　(iii)　$75 = 35 + x \qquad x = 75 - 35 \qquad x = 40°$

　　(iv)　$110° = 50 + x \qquad x = 110 - 50 \qquad x = 60$

　　(v)　$70 = x + 40 \qquad x = 70 - 40 \qquad x = 30$

　　(vi)　$110 = 50 + x \qquad x = 110 - 50 \qquad x = 60$

3.　　(i)　$x = 50 + 50 \qquad x = 100° \qquad\qquad$ (ii)　$x = 30 + 60 \qquad x = 90°$

　　(iii)　$x = 30 + 40 \qquad x = 70° \qquad\qquad$ (iv)　$x = 60 + 70 \qquad x = 130°$

　　(v)　$x = 30 + 60 \qquad x = 90° \qquad\qquad$ (vi)　$x = 50 + 30 \qquad x = 80°$

4.　　(i)　$6x + 8 = 67° + 49°$

　　　　$6x = 116 - 8 \qquad 6x = 108 \qquad x = \dfrac{108^{18}}{6} \qquad x = 18$

　　(ii)　$11x + 5 = 12 - x + 65$

　　　　$11x + 5 = 77 - x \qquad 11x + x = 77 - 5 \qquad 12x = 72, x = 6$

　　(iii)　$4x + 80 = 60 + 60$

　　　　$4x = 12 - 80 \qquad 4x = 40 \qquad x = 10$

(47)

(iv) $90° = 7x - 2 + 5x + 8$

$90° = 12x - 6$ $12x = 90 + 6$ $12x = 96, x = 8$

(v) $60 - x = 6x - 3$

$6x + x = 60 + 3$ $7x = 63, x = 9$

(vi) $117 = 3x + 57$

$3x = 117 - 57$ $3x = 60, x = 20°$

5.   ratio $= 3 : 5$

$3x + 5x = 120$ $8x = 120$ $x = \dfrac{120^{15}}{8}$ $x = 15$

$3x = 3 \times 15 = 45$ $5x = 5 \times 15 = 75$ $\angle A = 45, \angle B = 75$

$\angle C = 180 - (\angle A + \angle B) = 180 - (45 + 75) = 180 - 120 = 40$

Exercise = 11.2

1.   (i) $x + 112 + x = 180$

$2x = 180 - 112$ $2x = 168$ $x = 84$

(ii) $112° + 60 + 3x + 9 = 180$

$3x = 180 - 181$ $x = \dfrac{-1}{3}$

(iii) $60 + 60 + 8x + 60 = 180$

$8x = 180 - 180$ $x = 0$

(vi) $58 + x + 2x = 180$

$3x = 180 - 58$ $3x = 122$ $x = \dfrac{122}{3}$

(v) $30 + 90 + 19x + 3 = 180$

$19x = 180 - 124$ $x = \dfrac{57}{19}$ $x = 3$

(vi) $7x - 4 + 6x - 4 + 5x + 8 = 180$

$18x = 180$ $x = 10$

2. $\angle A = 45°, \ \angle B = 75°,$

$\angle A + \angle B + \angle C = 180°$ $\angle C = 180 - 45 - 75$ $\angle C = 180 - 120 = 60$

3. $3 : 4 : 5$

$3x + 4x + 5x = 180$ $12x = 180$ $x = \dfrac{180^{15}}{12}$ $x = 15$

$3x = 3 \times 14 = 42$ $4x = 4 \times 14 = 56$ $5x = 5 \times 14 = 70$

4. $3\angle A = 4 < B = \angle C$

$\angle A + \angle B + \angle C = 180$ $\angle A + \dfrac{3}{4}\angle A + \dfrac{1}{2}\angle A = 180$ $4\angle A + 3\angle A + 2\angle A = 180 \times 4$

$9\angle A = 180 \times 4$ $\angle A = \dfrac{180^{20} \times 4}{9}$ $\angle A = 80$

$\angle B = \dfrac{3}{4}\angle A, = \dfrac{3}{4} \times 80^{20} = 60°$ $\angle C = \dfrac{1}{2}\angle A = \dfrac{1}{2} \times 80 = 40°$

5. $AB = AC, \angle A = 80, \angle C = \angle B,$

$\angle A + \angle B + \angle C = 180$

$80 + \angle B + \angle B = 180$

$2\angle B = 180 - 80$

$2\angle B = 100$

$\angle B = \dfrac{100}{2}$

$\angle B = 50$
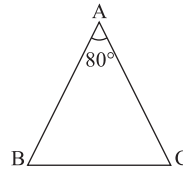
6. $AB = AC = BC$

$\angle A = \angle B = \angle C$

$\angle A + \angle B + \angle C = 180$

$\angle A + \angle A + \angle A = 180$

$3\angle A = 180$

$\angle A = 60°$

each angle 60°.
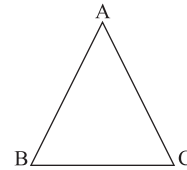
7. $AB = AC \quad \angle A = 50° \quad \angle B = 180 - x \quad \angle C = 180 - y$

$AB = AC \quad \angle B = \angle C \quad 180 - x = 180 - y \quad x = y \qquad \dots\text{(i)}$

$\angle A + \angle B + \angle C = 180° \quad 50 + (180 - x) + (180 - y) = 180°$

$230 - x - y = 0 \quad x + y = 230 \quad x + x = 230 \quad 2x = 230$

$x = 115 \qquad x = 115 \qquad y = 115.$

8. $\because \angle A + \angle B + \angle C = 180°$

$\angle ACD = 180 - \angle C \quad \angle BAE = 180 - \angle A \quad \angle CBF = 180 - \angle B$

$\angle ACD + \angle BAE + \angle CBF = 180 - \angle C + 180 - \angle A + 180 - \angle B$

$= 540 - (\angle A + \angle B + \angle C) = 540 - 180 = 360$

9. $\angle ABC = 40°, \angle BAC = 90°$

$\angle DAC = 30° \quad \angle A + \angle B + \angle C = 180$

$\angle ACD = 180 - 40 - 90, = 180 - 130$

$\angle ACD = 50, \quad \angle ADC = 180 - 50 - 30 = 180 - 80 = 100$

$\angle ADC \quad = 100° \quad \angle BAD \quad = 90 - 30, \quad = 60° \qquad \angle ADB \qquad = 180 - 40 - 60$

$180 - 100, = 80°.$

10. $\angle D \perp AB \qquad \angle A = 65$

$\angle ACD + \angle A = 90° \qquad \angle ACD = 90 - 65 = 25°$

$\angle CBD = 180 - 90 - 65 = 180 - 155 = 25$

$\angle BCD = 180 - 25 - 90 = 180 - 115 = 65$

11. $\angle A + \angle C + \angle E = 180 \dots \text{(i)} \qquad\qquad \angle B + \angle F + \angle D = 180 \dots\text{(ii)}$

equation (i) to (ii)
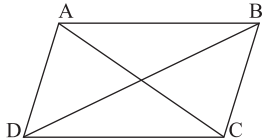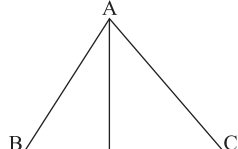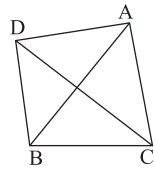
$\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = 180 + 180 = 360°$

12. $DE \parallel BC \quad \angle B = 30° \quad \angle A = 40° \quad Z° = y° \qquad \dots\text{(i)}$

$x + Z + 40 = 180 \qquad 30 + Z + 40 = 180$

$Z = 180 - 70 \qquad Z = 110, \ y = 110.$

1.   (i) $1\cdot 8,\ 3\cdot 5,\ 6\,(\text{cm})$ $1\cdot 8+6>3\cdot 5$ $1\cdot 8+3\cdot 5\not> 6$ No.

    (ii) $1,\ 3,\ 2\,(\text{cm})$ $1+2\not> 3$ No.

    (iii) $1\cdot 5,\ 2\cdot 5,\ 5\,(\text{cm})$ $1\cdot 5+2\cdot 5\not> 5$ No.

    (iv) $5,\ 7,\ 12\,(\text{cm})$ $5+12\not> 7$ No.

    (v) $8\cdot 5,\ 2,\ 5\,(\text{cm})$ $8\cdot 5+2>5$ $2+5\not> 8\cdot 5$ No.

    (vi) $3\cdot 4+2\cdot 1>5\cdot 3$ $5\cdot 3+2\cdot 1>3\cdot 4$ $3\cdot 4+5\cdot 3>2\cdot 1$ Yes.

2.   No, we can bot draw $\triangle ABC$ b c z A, B, C are collinear (situated at a line)

3. $AB=12\,\text{cm},$ $BC=15\,\text{cm},$

     $AB+BC=12+15=27$ Third side should be less than 27°.

4.   In $\triangle ABC$

     $AB+BC>AC$

     In $\triangle ADC$

     $AD+CD>BD$

     so, $AB+BC+AD+CD>AC+BD$

5.   In $\triangle ABM$

     $AB+BM>AM\ldots(\text{i})$

     In $\triangle AMC$

     $AC+MC>AM\ldots$ (ii), equation (i) + (ii)

     $AB+(BM+MC)+AC>AM+AM$

     $AB+BC+AC>2AM$

6.   (i)   In $\triangle AOB,\ OA+OB>AB\ \ldots(\text{i})$

    (ii)   m $\triangle BOC,\ OB+OC>BC\ldots$ (ii)

    (iii)   In $\triangle COA,\ OC+OA>AC\ \ldots(\text{iii})$

    (iv)   equation (i) + (ii) + (iii)

         $2\,(OA+OB+OC)>AB+BC+AC$

7.   (i) $BD<AB+AD$ (ii) $BD+CD>BD$

    (iii) $BD<\dfrac{1}{2}\,(AB+BC+AC)$

1.   (i) $10^2=6^2+8^2=36+64,\ 100=100,$ yes.

    (ii) $11^2=5^2+8^2,\ =25+64\ 121\neq 89,$ No.

2. $5\,\text{cm},\ 12\,\text{cm},\ H^2=5^2+12^2,\ =25+144=169$

     $H=13\,\text{cm}$

3. $H^2=800\,\text{cm}^2,\ H^2=x^2+x^2,\ 1800=2x^2,\ x^2=400$

     $x=20\,\text{cm},\ 20\,\text{cm},\ 20\,\text{cm}$

4.   Distance $=\sqrt{6^2+8^2}=\sqrt{36+64}=\sqrt{100}=10\,\text{km}$

5.   Third side $=\sqrt{40^2+41^2}=\sqrt{1600+1681}=\sqrt{3281}=57\cdot 28\,\text{cm}$

     Perimeter $=57\cdot 28+40+41=138\cdot 28\,\text{cm}$

6. Distance between tope

$$d = \sqrt{15^2 + 36^2}$$
$$= \sqrt{225 + 1296}$$
$$= \sqrt{1521}$$
$$= 39\,cm$$
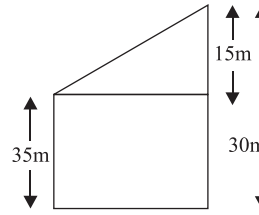
7. $D^2 = 1250\,cm$

$x^2 + x^2 = 1250 \qquad 2x^2 = 1250 \qquad x^2 = 625 \qquad x = 25\,cm$

8. $AC = 16\,cm \qquad OA = 8\,cm \qquad BD = 30\,cm \quad OD = 15\,cm$

$$AD^2 \quad = OA^2 + OD^2$$
$$AD^2 \quad = 8^2 + 15^2$$
$$= 64 + 225$$
$$= 289\,AD$$
$$= 17\,cm.$$
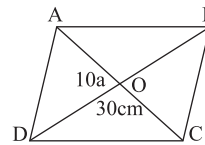
9. $\angle C = 90°$

$AC = BC$
$$AB^2 = AC^2 + BC^2$$
$$AB^2 = AC^2 + AC^2$$
$$AB^2 = 2AC^2$$
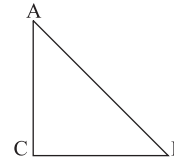
10. Length of the street

$$= \sqrt{17^2 - 8^2} + \sqrt{17^2 - 15^2}$$
$$= \sqrt{289 - 64} + \sqrt{289 - 225}$$
$$= \sqrt{225} + \sqrt{64}$$
$$= 15 + 8$$
$$= 23\,m$$
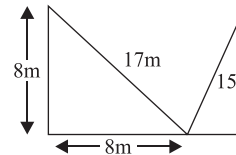
11. (i) $x^2 = 8^2 + 15^2 = 64 + 225 = 289 \qquad x = 17\,cm$

(ii) $x^2 = 24^2 + 7^2 = 576 + 49 = 625 \qquad\qquad x = 25\,cm$

(iii) $y^2 = 5^2 - 3^2 = 25 - 9 = 16,\ y = 16\,cm$

$\qquad x^2 = 12^2 - 3^2 = 144 - 9 = 135 \qquad x = \sqrt{135} \qquad x = \sqrt[3]{15}\,cm$

(iv) $y^2 = 37^2 - 12^2 = 1369 - 144 = 1225 \qquad\qquad y = 35\,cm$

$\qquad CD^2 = 37^2 - 12^2 \qquad CD = 35 \qquad x = y + y = 35 + 35 = 70\,cm$

12. (i) 8, 18, 17, $8^2 + 15^2 = 64 + 225 = 289 = 17^2$ \qquad Yes.

(ii) 6, 8, 10, $6^2 + 8^2 = 64 + 36 = 100 = 10^2$ \qquad\qquad Yes.

(iii) 5, 6, 7, $5^2 + 6^2 = 25 + 36 = 61 \neq 7^2$ \qquad\qquad No

(iv) 14, 48, 50, $14^2 + 48^2 = 196 + 2304 = 2500 = 50^2$ \quad Yes

(v) 1, 2, 3, $1^2 + 2^2 = 1 + 4 = 5 \neq 3^2$, No

(vi) 20, 48, 52, $20^2 + 48^2 = 400 + 2304 = 2704 = 52^2$ \quad Yes

Chapter-12 Congruence

Exercise = 12.1

1. (i) They are of equal lengths

(ii)   Their measures are equal

(iii) They have the same side length

(iv)   Their dimensions are same

(v)   They have the same radius

2.   sin

3.   (i) and (iii) are congruent

4.   (i) $\Delta\, PQR \cong \Delta\ XYZ$

   $P \leftrightarrow X,$ $Q \leftrightarrow y,$ $R \leftrightarrow Z$

   $PQ = XY$ $PR = XZ$ $QR = YZ$

   $\angle P = \angle X$ $\angle Q = \angle Y$ $\angle R = \angle Z$

   (ii) $\Delta\, PQR \cong \Delta\, YZX$

   $P \leftrightarrow Y,$ $Q \leftrightarrow Z,$ $R \leftrightarrow X$

   $PQ = YZ,$ $PR = YX$

   $QR = XZ,$ $\angle P = \angle Y,$ $\angle Q = \angle Z,$ $\angle R = \angle X$

5. $\Delta\, ABC \cong \Delta\, FED$ $ABC \leftrightarrow FED$

   $A \leftrightarrow F$ $B \leftrightarrow E$ $C \leftrightarrow D$

   $\angle A = \angle F$ $\angle B = \angle E$ $\angle C = \angle D$

   $AB = FE$ $BC = ED$ $AC = FD$

6. $\Delta\, DEF \cong \Delta\, BCA$

   (i) $\angle E = \angle C$ (ii) $EF = CA$ (iii) $\angle F = \angle A$ (iv) $DF = BA$

Exercise = 12.2

1.   (i) $AB = PQ = 2\,cm$ $AC = PR = 3\,cm$

   $BC = QR = 4\,cm$ $\Delta\, ABC \cong \Delta\, PQR$

   (ii) $MN = XY = 2\,cm$ $\angle N = \angle Y = 60°$ $\Delta\, MNO \cong \Delta\, XYZ$

   (iii) $AD = BC = 3\,cm$ $DC = AB = 5\,cm$ $AC = CA = 67\,cm$ $\Delta\, ADC \cong \Delta\, ABC$

   (iv) $AE = DC = 5\,cm$ $AB = CB = 5\cdot 7\,cm$ $\angle A = \angle C = 40°\,cm$ $\Delta\, ABE \cong \Delta\, DBC$

   (v) $AD = AD, BD = DC = 3\,cm$ $\angle D = \angle D = 90°$ $\Delta\, ADB \cong \Delta\, ADC$

   (vi) $OD = OB = 2\,cm$ $\angle D = \angle B = 100$ $\angle DOA = \angle COB$ $\Delta\, ADO \cong \angle\, BOC$

   (vii) $\angle CAB = \angle DAB = 30$ $\angle CBA = \angle DBA$ $\angle CAB \ne \angle CB$ $\Delta\, ACB \cong \Delta\, ADB$

   (viii) $AB = AD = 3\cdot 6\,cm$ $AC = AC$ $\angle B = \angle D\,\Delta\, ABC \cong \Delta\, ADC$

   (ix) $AB = AC = 3\,cm$ $\angle D = \angle D = 90°$ $AD = AD$ $\Delta\, ADB \cong \Delta\, ADC$

2.   (i) $\Delta\, ABC : AB = 4\,cm$ $BC = 5\,cm$ $CA = 3\,cm,$

   $\Delta\, DEF : DE = 3\,cm$ $EF = 4\,cm$ $FD = 5cm,$

   $CA = DE$ $BC = FD$ $AB = EF$ $\Delta\, ABC \cong \Delta\, DEF$

   (ii) $PQ = EF$ $DR = DE$ $\Delta\, PQR \cong \Delta\, DEF$

3.   (i) $PS = RS,$ $PQ = RQ$

   $PS = RS$ $PQ = RQ$ $SQ = SQ$ $\Delta\, PQS \cong \Delta\, RQS$

   (ii) Yes

   (iii $\because \Delta\ PQS \cong \Delta\, RQS$ $\angle PQS = \angle RQS$

   SQ is bisector of $\angle PQR$

4. $\angle Q = \angle N = 100$ $\angle OQ = ON$ $\angle QOP = \angle NOM$

    $\triangle MON \cong \triangle PQO \angle ASQ$

5. $\angle A = \angle B = 90°$ $BD = AC$ $AB = AB$ (i) $\triangle ABC \cong \triangle BAD$

6. $2y + 3 = 25$

    $2y = 25 - 3$ $2y = 22$ $y = \dfrac{\cancel{22}^{11}}{\cancel{2}}$ $y = 11$

    $3x - 7 = 32$

    $3x = 32 + 7$ $3x = 39$ $x = \dfrac{\cancel{39}^{13}}{\cancel{3}}$ $x = 13$

7. $AB = AC, \quad BD = DC$

    $AB = AC \quad BD = DC \quad AD = AD$

    $\triangle ABD \cong \triangle ACD \quad \angle BAD = \angle CAD \quad \angle ADB = \angle AOC$

    $\angle ADB + \angle ADC = 180 \quad\quad 2 \angle ADB = 180 \quad\quad \angle ADB = 90° \quad AD \perp BC$

8. $AB = AC \quad\quad AD \perp BC$

    $AB = AC$

    $AD = AD$

    $BD = DC$

    $\triangle ABD \cong \triangle ACD$

    $\angle B = \angle C$ proved
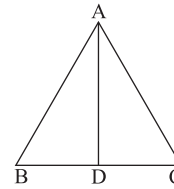
9. T.P.T $AD \perp BC$
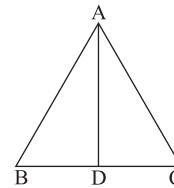
    $AB = AC \quad \angle B = \angle C \quad AD = AD$

    $\triangle ABD \cong \triangle ACD$

    $BD = DC$

    $\angle ADB = \angle ADC \quad \angle ADB + \angle ADC = 180$

    $2 \angle ADC = 180 \quad\quad \angle ADC = 90$

    $AD \perp BC$

10. (i) $AB = AC$
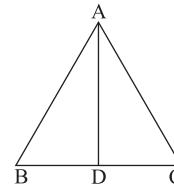
       $\angle B = \angle C$

       $AD = AD$

   (ii) $\triangle ADB \cong \triangle ADC$ m

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

   (iv) $BD = CD$

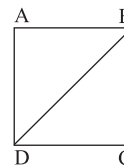11. (i) $\triangle ABC$ and $\triangle ADC$

       $AB = DC$

       $BC = AD$

       $AC = AC$

       $\triangle ABC \cong \triangle ADC$

   (ii)   Perimeter of quare $= 4$ side

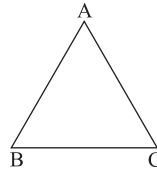12. $\angle ABD = \angle DCA = 20 \quad\quad$ so, $OA = OD$

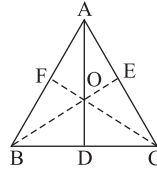 $\angle DBC = \angle ACB = 40° \quad\quad$ so $OC = OA$

$$OA + OC = OD + OA \qquad AC = DA \qquad \angle ABC = \angle DCA$$
$$BC = BC \qquad\qquad \Delta ABC \cong \Delta DCB$$

13. $AB = BC = AC$

   $\angle A = \angle B = \angle C$

   $\angle A + \angle B + \angle C = 180$

   $3 \angle A = 180$

   $\angle A = \dfrac{180}{3}$

   $\angle A = 60$ each angle $60°$

14. $AD = BE = CF$

   $\angle B = \angle C = \angle A$

   $AC = AB = BC$

   Hence ΔABC is an equilateral triangle. proved

Chapter-13 Construction

Do your self

Chapter-14 Symmetry

Exercise = 14.1

1. Do your self
2. (ii), (iv), (v) and (vi)
3.   (i) A, E, M   (ii) H, I, X 4. F, G, N, P, Q
5. $AY = 3$ cm, $YB = 4$ cm, $xz = 14$ cm
6.   (i) $\angle BAO = 20°$

   (ii) $OC = 4 \cdot 5$ because the line of symmetry of the isosceles triangle is the angle bisector of
       $\angle A$ and also the median of ΔABC

7. If is a right angled isosceles triangle because every isosceles has a line of symmetry.

Exercise = 14.2

Do your self

Exercise = 14.3

1.   (i) 5,72° (ii) 1,360° (iii) 3,120° (iv) 12,180°,

2.

Alphabet Letters	C	E	H	N	O	S	Z
Line of Symmetry	Yes	Yes	Yes	No	Yes	No	No
Numbers of Lines of Symmetry	One	One	Two	Zero	Many	Zero	Zero
Rotational Symmetry	No	No	Yes	Yes	Yes	Yes	Yes

Order of ration not Symmetry	Does not have	Does not have	Two	Two	Infinite	Two	Two

3. (i) 4 (ii) 3 (iii) 3 (iv) 4 (v) 2 (vi) 4 (vii) 5 (viii) 6

Chapter-15 Visualising Solid Shapes

Exercise = 15.1

1. (ii), (iv), (vi)

2. (i), (iii)

3. (i) $2 \rightarrow 4$ $3 \rightarrow 5$ $1 \rightarrow 6$ (ii) $1 \rightarrow 4$ $3 \rightarrow 5$ $2 \rightarrow 6$

     (iii) $1 \rightarrow 3$ $2 \rightarrow 5$ $4 \rightarrow 6$

4. No   **5.** (i) 6, 4, 4   (ii) 10, 6, 6   (iii) 8, 5, 5   (iv) 12, 7, 7

6. (i)

```
        1
    3 2 4 5
        6
```
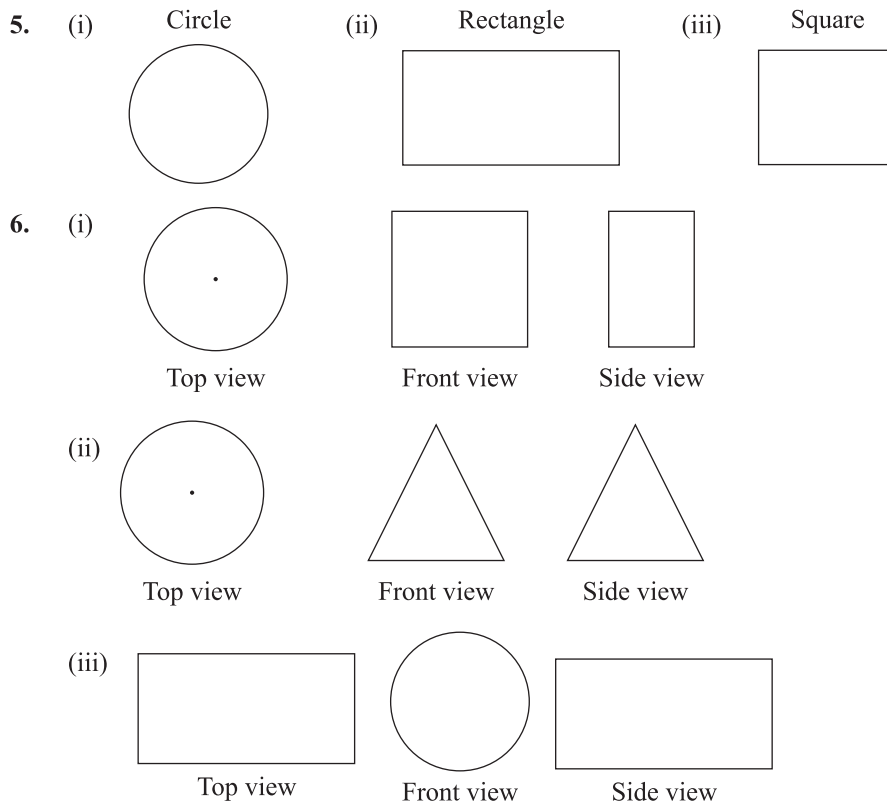
    (ii)

```
        1 2
      5 3
    4 6
```

Exercise = 15.2

1. Do your self   **2.** Do your self   **3.** Do your self   **4.** Do your self

Exercise = 15.3

1. (i) 30   (ii) 36   (iii) 30

2. (i) 9   (ii) 36

3. (i) 3   (ii) 7, 4.

4.

	Solids	Vertical	Horizontal
(i)	Brick	Rectangle	Square
(ii)	Apple	Heart Shake	Circle
(iii)	Die	Square	Square
(iv)	Glass	Rectangle	Circle
(v)	Cone	Triangle	Circle
(vi)	Lunch Box	Rectangle	Rectangle
(vii)	Ball	Circle	Circle
(vii)	Match Box	Rectangle	Rectangle

5. (i) Circle   (ii) Rectangle   (iii) Square

6. (i)

Top view   Front view   Side view

(ii)

Top view   Front view   Side view

(iii)

Top view   Front view   Side view

Chapter-16 Mensuration

Exercise = 16.1

1. The perimeter of triangle $= AB + BC + CA$
$= 6\,cm + 4\,cm + 8\,cm = 18\,cm$

2. (i) The perimeter of a square $= 4 \times$ side $= 4 \times 5\,cm = 20\,cm$

   (ii) The perimeter of as quare $4 \times$ side $= 4 \times 15\,cm = 60\,cm$

3. The length of a plot $= 50\,m$
The breadth of a plot $= 30\,m$
Perimeter of the plot $=$ length $\times$ breadth $= 50\,m \times 30\,m = 1500\,m^2$
The cost of fencing rate $= \grave{}\,1000\,per\,meter$
The cost of $1500\,m$ plot $= 1500 \times 1000 = \grave{}\,15,00,000$

4. The perimeter of a rectangle $= 2\,(l + b)$
$= 2\,(12\ cm + 5 \cdot 5\,cm) = 2 \times 17 \cdot 5 = 35\,cm^2$

5. The perimeter of rectangular sheet $= 100\,cm$
The length of it $= 35\,cm$
The breadth $= 100 = 2\,(35 + b),\ 500 = 35 + b$
$h = 50 - 35 = 15\,cm$

9. (i) perimeter $= 10 + 10 + 10 + 10 + 10 = 50\,cm$

(**56**)

(ii)   perimeter $= 25\,cm + 5\,cm + 10\,cm + 6\,cm + 10\,cm + 15\,cm = 71\,cm$

(iii)   perimeter $= 70\,cm + 50\,cm + 60\,cm + 30\,cm = 210\,cm$

10.   (i)   perimeter of the figure $= 2\,cm + 4\,cm + 2\,cm + 4\,cm + 2\,cm + 4\,cm = 18\,cm^2$

(ii) $2\,cm + 5\,cm + 1\,cm + 7\,cm + 3\,cm = 18\,cm^2$

(iii) $25\,cm + 20\,m + 40\,m + 35\,m + 70\,m = 190\,m$

(iv), (v) and (vi) do your self.

Exercise = 16.2

1.   (i)   Area of rectangle $=$ length $\times$ breadth $= 22 \cdot 5\,m \times 16\,m = 360\,m^2$

(ii)   Area of rectangle $=$ length $\times$ breadth $= 11 \cdot 5\,m \times 8\,m = 11 \cdot 5 \times 0 \cdot 8 = 9 \cdot 2\,m$

2.   Do your self

3.   Diagonal of the square $= \sqrt[7]{2}\,cm$

$\Rightarrow$ side $\sqrt{2} = \sqrt[7]{2}\,cm$

$$\text{side} = \frac{\sqrt[7]{2}}{\sqrt{2}} = 7\,cm$$

Area of the square $= (\text{side})^2 = (7)^2 = 49\,cm^2$

4.   The area of a field $=$ length $\times$ breadth $= 240\,m \times 1100 = 26400\,m^2$

$\therefore$ one hector $= 10000\,m^2$

The area in hector $= \dfrac{26400}{10000} = 2 \cdot 64\,m$

5.   Perimeter of a square park $= 4 \times$ side $= 360\,m$

So, the side of squar park $= \dfrac{360}{4} = 90$

The area of square park $= (\text{side})^2 = (90)^2 = 90 \times 90 = 8100\,m^2$

6.   The area of rectangular plot $= 440\,m^2$

The length of the rectangular plot $= 22\,m$

The breadth of the rectangle $= \dfrac{440}{22} = 20$

The perimeter of rectangular park $= 2\,(1 + b)$
$= 2\,(20 + 22) = 2 \times 42 = 84\,m$

7. as similar as 6. so, do your self.

8.   Do your self   9. Do your self   10. Do your self

Exercise = 16.3

Do your self

Exercise = 16.4

Do your self

Exercise = 16.5

Do your self

Do your self.

Chapter-17 Data Handling

Exercise = 17.1

1. Mean runs $(\overline{X}) = \dfrac{\text{Total runs}}{\text{Total players}} = \dfrac{47 + 50 + 60 + 59 + 70 + 68}{6} = \dfrac{354}{6} = 59$

2. (i) The ten natural numbers = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

    The mean $(\overline{X}) = \dfrac{\text{total numbers}}{\text{number of observation}}$

    $= \dfrac{1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10}{10} = \dfrac{55}{10} = 5.5$

    (ii) First eight odd numbers = 1, 3, 5, 7, 9, 11, 13, 15

    $\text{Mean} = \dfrac{1 + 3 + 5 + 7 + 9 + 11 + 13 + 15}{8} = \dfrac{64}{8} = 8$

    (iii) First six prime numbers = 2, 3, 5, 7, 11, 13

    $\text{Mean} = \dfrac{2 + 3 + 5 + 7 + 11 + 13}{6} = \dfrac{41}{6} = 6.83$

3. (i) highest = 95, lowest = 39,

    (ii) Range = 95 − 39 = 56

    (iii) $\text{Mean} = \dfrac{85 + 76 + 90 + 84 + 39 + 48 + 59 + 95 + 81 + 75}{10} = \dfrac{732}{10} = 73.2$

4. (i) Range = Highest − lowest = 20.5 − 0 = 20.5

    (ii) $\text{Mean} = \dfrac{0.0 + 12.2 + 2.1 + 0.0 + 20.5 + 5.3 + 1.0}{7} = \dfrac{41.1}{7} = 5.87$

    (iii) five days 5. the mean $= \dfrac{7 + 9 + 6 + x + 5}{5} = 8$

    The value of $x = 5 \times 8 = 40 = 7 + 9 + 6 + 5 = 27$

    $= 40 − 27 = 13, x = 13$

6. The mean of 10 number = 20

    So the numbers $= \dfrac{20 + 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20}{10} = \dfrac{200}{10} = 20,$

    So, the new mean $= \dfrac{15 + 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15 + 15}{10} = \dfrac{150}{10} = 15$

7. The mean of 6 boys = 48 kg

    The individual weights of five = 51 kg, 45 kg, 49 kg, 46 kg and 44 kg

    The weight of sixth boy $= \dfrac{51 + 45 + 49 + 46 + 44 + x}{6}$

    $= \dfrac{235 + x}{6} = 48, \therefore 6 \times 48 = 288$

    and = 288 − 235 = 53

    So, the sixth boy weight = 53 kg.

8. The mean of five numbers $= 28$

The excluded $= 28 + 5 + 2 + 1 = 36$

9., 10., 11., 12., 13. Do your self

Exercise = 17.2

1 The score of ten matches $= 2, 3, 5, 4, 0, 1, 3, 3, 3, 4$

Arrange in ascending order $= 0, 1, 2, 3, 3, 3, 3, 4, 4, 5$

The $n = 10$ (even) so Median $= \left(\dfrac{n}{2}\right)^{th} = \left(\dfrac{10}{2}\right)^{th} 5th = 3$

2. Weight of 11 students $= 42, 52, 48, 52, 55, 58, 53, 54, 46, 49, 57$

Arranging the given data in ascending order $42, 46, 48, 49, 52, 52, 53, 54, 55, 57, 58$

Here $n = 11$, which is add

$\therefore$ Median $= \left(\dfrac{n+1}{2}\right)^{th} = \left(\dfrac{11+1}{2}\right)^{th} = \left(\dfrac{12}{2}\right)^{th} = 6^{th}$

So, Median $= 52$

3. Do your self.

4. (i)   25, 14, 28, 17, 18, 14, 25, 14, 17, 14

Arranging in ascending order

14, 14, 14, 14, 17, 17, 18, 25, 25, 28

14 occurs most frequently (4 times)

So, the mode is 14, (ii) Do your self 5.

5.

Size	No. of Shirt
38	24
39	31
40	23
42	14
44	17

6. Arrange the data in ascending order

1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 6, 6,

Here, 2 Occurs most frequently (14 times)

So, the mode is 2.

7. Do yourself

8. Do yourself

Exercise = 17.3

Do your self

Exercise = 17.4

1.   (i)   certain to happen   (ii) can happen but not certain

(iii) Impossible   (iv) can happen but bot certain

(v) can happen but not certain   (vi) can happen but not certain

(viii) can happen but not certain   (viii) Impossible

2.   (i) $\dfrac{3}{11}$ (ii) $\dfrac{2}{11}$ (iii) $\dfrac{1}{11}$

4.   (i) $\dfrac{59}{100}$ (ii) $\dfrac{41}{100}$

5.   (i) $\dfrac{21}{50}$ (ii) $\dfrac{29}{50}$

6.   6

7.   (i) $\dfrac{1}{6}$ (ii) $\dfrac{1}{2}$ (iii) $\dfrac{1}{2}$ (iv) $\dfrac{1}{3}$ (v) $\dfrac{2}{3}$

8.   (i) $\dfrac{1}{15}$ (ii) $\dfrac{14}{15}$

9.   (i) $\dfrac{21}{100}$ (ii) $\dfrac{11}{20}$ (iii) $\dfrac{6}{25}$