Ratio and Proportion

1.

i) Given ratio $= \frac{1}{6} : \frac{1}{9} = \frac{1/6}{1/9} = \frac{1}{6} \times 9$

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

$$= 3 : 2$$

ii) Given ratio $= 4\frac{1}{2} : 1\frac{1}{8}$

$$= \frac{9}{2} : \frac{9}{8} = \frac{9/2}{9/8}$$

$$= \frac{9}{2} \times \frac{8^4}{9}$$

$$= 4 \cdot 1$$

iii) $\frac{1}{5} : \frac{1}{10} : \frac{1}{15}$

Lcm of 5, 10, 15 is 30

$$\begin{array}{r} 5 \underline{| 5, 10, 15} \\ 1, 2, 3 \end{array}$$

$$= \frac{1}{5} \times 30 \quad \frac{1}{10} \times 30 : \frac{1}{15} \times 30 \qquad 5 \times 2 \times 3 = 30$$

$$= 6 : 3 : 2$$

2

i) ₹ 5 to 50 paise

$$= \frac{5 \times 100 \text{ paise}}{50 \text{ paise}}$$

$$= \frac{50}{5} = 10 : 1$$

ii. 3 km to 300 m

$$= \frac{3 \times 1000 \text{ m}}{300}$$

$$= \frac{3000}{300}$$

$$= 10 : 1$$

iii) 9m to 27 cm

$$= \frac{9 \times 100 \text{ cm}}{27}$$

$$= \frac{900^{100}}{27_3}$$

$$= 100 : 3$$

iv) 15 kg to 210 g

$$= \frac{15 \times 1000 \text{ g}}{210}$$

$$= \frac{15000^{500}}{210_7}$$

$$= 500 : 7$$

v) 25 minutes to 1·5 hours

$$= \frac{25 \text{ minutes}}{1·5 \times 60 \text{ minutes}}$$

$$= \frac{25^5}{90_{18}} \quad = 5 : 18$$

vi) 30 days to 36 hours

$$= \frac{\overset{5}{\cancel{30}} \times \overset{4}{24} \text{ hours}}{\underset{\cancel{1}}{\cancel{36}} \text{ hours}}$$

$= 20 : 1$

3. $A : B = 3 : 4$; $B : C = 8 : 9$

$$\frac{A}{B} = \frac{3}{4} \quad ; \quad \frac{B}{C} = \frac{8}{9}.$$

Now $\frac{A}{C} = \frac{A}{B} \times \frac{B}{C} = \frac{\cancel{3}^1}{\cancel{4}_1} \times \frac{\cancel{8}^2}{\cancel{9}_3}$

$A : C = 2 : 3$

4. $A : B = 5 : 8$, Value of $B = 8$

$B : C = 18 : 25$, value of $B = 18$

LCM of these two value of B i.e 8 and 18 is 72.

Thus,

$A : B = 5 : 8 = \frac{5}{8} = \frac{5 \times 9}{8 \times 9} = \frac{45}{72} = 45 : 72$ and

$B : C = 18 : 25 = \frac{18}{25} = \frac{18 \times 4}{25 \times 4} = \frac{72}{100} = 72 : 100$

$A : B : C = 45 : 72 : 100$.

5. Let

$3A = 2B = 5C = k$ (say), then

$A = \dfrac{k}{3}$, $B = \dfrac{k}{2}$, $C = \dfrac{k}{5}$.

$\therefore A:B:C = \dfrac{k}{3} : \dfrac{k}{2} : \dfrac{k}{5}$

$= \dfrac{1}{3} : \dfrac{1}{2} : \dfrac{1}{5}$

Lcm of 3, 2, 5 is 30

$= \dfrac{1}{3} \times 30 : \dfrac{1}{2} \times 30 : \dfrac{1}{5} \times 30$

Hence, $A:B:C = 10 : 15 : 6$

6.

Given   Income = ₹120

Spendings = ₹90

Savings = Income − Spendings

$= 120 - 90$

$= ₹ 30$.

i) $\dfrac{Spending}{Income} = \dfrac{90}{120} = \dfrac{9}{12} = 3:4$

ii) $\dfrac{Savings}{Income} = \dfrac{30}{120} = \dfrac{1}{4} = 1:4$

iii) $\dfrac{Savings}{Spendings} = \dfrac{30}{90} = \dfrac{1}{3} = 1:3$.

7.   An Alloy Contains = 5 grams.

     out of which Copper was $= 3\frac{3}{4}$ grams

$$= \frac{15}{4} \text{ grams}$$

Now Nickel Contains $= 5 - \frac{15}{4}$

$$= \frac{20 - 15}{4}$$

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

$\dfrac{Nickel}{Copper} = \dfrac{5/4}{15/4} = \dfrac{\cancel{5}}{4} \times \dfrac{4}{\cancel{15}3} = \dfrac{1}{3} = 1:3.$

8. Let the two pieces will be $x, \frac{x}{2}$

    Total height of pole = 3 metres

$$\text{i.e } x + \frac{x}{2} = 3$$

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

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

$$x = \frac{3 \times 2}{3}$$

$$x = 2, \quad \frac{x}{2} = \frac{2}{2} = 1$$

∴ Length of two pieces are 2, 1 metres

9. Given Height of Anshul & Dhruv are 1.04 m and 78 cm

Ratio of their heights = $\dfrac{\text{Height of Anshul}}{\text{Height of Dhruv}}$

$$= \dfrac{1.04 \text{ m}}{78 \text{ cm}}$$

$$= \dfrac{1.04 \times 100}{78} \qquad (\because 1m = 100 \text{ cm})$$

$$= \dfrac{104}{78}$$

$$= 4 : 3$$

10.

Total money to be shared = ₹ 180

Ratio of three children = $\dfrac{1}{3} : \dfrac{1}{4} : \dfrac{1}{6}$

LCM of 3, 4 and 6 is 12

$$= \dfrac{1}{3} \times 12 : \dfrac{1}{4} \times 12 : \dfrac{1}{6} \times 12$$

$$= 4 : 3 : 2$$

$$
\begin{array}{r|l}
3 & 3,4,6 \\
\hline
2 & 1,4,2 \\
\hline
 & 1,2,1
\end{array}
$$

Total sum of ratio = 4+3+2 = 9.

1st Children share = $\dfrac{4}{9} \times \overset{20}{\cancel{180}}$ = 4×20 = ₹ 80.

2nd children share = $\dfrac{3}{\cancel{9}_1} \times \overset{20}{\cancel{180}}$ = 3×20 = ₹ 60

3rd children share = $\dfrac{2}{\cancel{9}} \times \overset{20}{\cancel{180}}$ = 2×20 = ₹ 40.

11. Let the two parts be $7x$, $11x$

   Given difference of two parts = 20.

   i.e $11x - 7x = 20$

   $$4x = 20$$

   $$x = \frac{20}{4}$$

   $$x = 5$$

   $\therefore 7x = 7 \times 5 = 35$; $11x = 11 \times 5 = 55$

   Sum of two numbers = $35 + 55 = 90$.

12. Let the total amount be ₹ x.

   The amount has been divided in to two parts

   in the ratio $9 : 13$.

   Sum of ratios = $9 + 13 = 22$.

   According to given condition, $\frac{13}{22}$ of ₹ $x = 260$

   $\Rightarrow \frac{13}{22} \times x = 260 \Rightarrow x = \frac{260 \times 22}{13}^{20}$

   $$x = ₹ 440.$$

   Hence, the total amount = ₹ 440.

13. As the present ages of Anjali and Ashu are in the ratio 2:3

Let their present ages be $2x$ years and $3x$ years resp.

After 5 years,

the age of Anjali will be $(2x+5)$ years and the age

of Ashu will be $(3x+5)$ years.

According to given information, $\dfrac{2x+5}{3x+5} = \dfrac{3}{4}$.

$$3(3x+5) = 4(2x+5)$$

$$9x+15 = 8x+20$$

$$9x-8x = 20-15$$

$$x = 5.$$

Hence, the present age of Anjali $= 2\times5 = 10$ years

and the present age of Ashu $= 3\times5 = 15$ years

14. Let their present ages of A and B be $5x$ years and

$6x$ years resp.

Three years ago,

The age of A will be $(5x-3)$ and the age of

B will be $(6x-3)$ years.

According to given information, $\dfrac{5x-3}{6x-3} = \dfrac{4}{5}$

$$5(5x-3) = 4(6x-3)$$

$$25x - 15 = 24x - 12$$

$$25x - 24x = 15 - 12$$

$$x = 3$$

Hence, the present age of A = 5×3 = 15 years

and the present age of B = 6×3 = 18 years.

15   Let the numbers be $5x$, $6x$.

     2 is added to first = $5x + 2$

     3 is added to second = $6x + 3$.

Their ratio, $\dfrac{5x+2}{6x+3} = \dfrac{4}{5}$

$$5(5x+2) = 4(6x+3)$$

$$25x + 10 = 24x + 12$$

$$25x - 24x = 12 - 10$$

$$x = 2 \implies 5x = 5 \times 2 = 10$$
$$6x = 6 \times 2 = 12$$

$\therefore$ The numbers are 10, 12.

16. Let the number of boys and girls be $7x, 6x$.

Total no. of students = 1430

$$7x + 6x = 1430$$
$$13x = 1430$$
$$x = \frac{1430}{13}$$
$$x = 110$$

∴ Number of boys $= 7x = 7 \times 110 = 770$

Number of girls $= 6x = 6 \times 110 = 660$

As, given 26 new girls are admitted

i.e $660 + 26 = 686$.

Let the new boys are admitted be x.

Ratio of number of boys to girls $= 8 : 7$

i.e $\dfrac{x + 770}{686} = \dfrac{8}{7}$.

$$x + 770 = \frac{8}{\cancel{7}} \times \overset{98}{\cancel{686}}$$

$$x + 770 = 784.$$

$$x = 784 - 770$$

$$x = 14 \text{ new boys are admitted.}$$

17 i) 5:6 or 6:7

$$\frac{5}{6} \quad ; \quad \frac{6}{7}$$

Lcm of 6,7 is 42

i.e $\frac{5}{6} \times \frac{7}{7} = \frac{35}{42}$; $\frac{6}{7} \times \frac{6}{6} = \frac{36}{42}$

As 36>35, So 6:7 is greater than 5:6.

ii) 13:24 (or) 17:32

$$\frac{13}{24} \quad (or) \quad \frac{17}{32}$$

Lcm of 24,32 is 96.

$$8 \begin{array}{|c} 24,32 \\ \hline 3, 4 \end{array}$$

i.e $\frac{13}{24} \times \frac{4}{4} = \frac{52}{96}$; $\frac{17}{32} \times \frac{3}{3} = \frac{51}{96}$

As 52>51, So 13:24 is greater than 17:32.

EXERCISE : 6.2

I

i) $2.5 : 1.5 = \dfrac{2.5}{1.5} \times \dfrac{10}{10}$

$\qquad\qquad = \dfrac{25}{15} = \dfrac{5}{3}$.

$7.0 : 4.2 = \dfrac{7.0}{4.2} \times \dfrac{10}{10}$

$\qquad\qquad = \dfrac{70}{42}^{5}_{3} = \dfrac{5}{3}$.

$\therefore \dfrac{2.5}{1.5} :: \dfrac{7.0}{4.2} = \dfrac{5}{3} :: \dfrac{5}{3}$, True

ii) $\dfrac{1}{2} : \dfrac{1}{3}$ $\qquad\qquad\qquad$ $\dfrac{1}{3} : \dfrac{1}{4}$

$\qquad$ Lcm of 2,3 is 6 $\qquad$ Lcm of 3,4 is 12

$\dfrac{1}{2} \times 6 : \dfrac{1}{3} \times 6 = 3:2$ $\qquad$ $\dfrac{1}{3} \times 12 : \dfrac{1}{4} \times 12 = 4:3$

$\qquad\qquad 3:2 \neq 4:3$, False.

iii) 24 men : 16 men $\qquad$; 33 horses : 22 horses

$\qquad = \dfrac{24}{16}$ $\qquad\qquad$; $= \dfrac{33}{22}$

$\qquad = \dfrac{3}{2}$ $\qquad\qquad\qquad = \dfrac{3}{2}$

$\qquad\qquad \dfrac{3}{2} = \dfrac{3}{2}$, True.

2

i) product of extremes = $18 \times 5 = 90$
product of means = $9 \times 10 = 90$.

By cross product rule, the numbers $18, 10, 9, 5$ are in proportion.

ii) $3\frac{1}{2} = 3 + \frac{1}{2} = \frac{6+1}{2} = \frac{7}{2}$.

$4\frac{1}{2} = 4 + \frac{1}{2} = \frac{8+1}{2} = \frac{9}{2}$.

product of extremes = $3 \times \frac{9}{2} = \frac{27}{2}$.

product of means = $4 \times \frac{7}{2} = \frac{28}{2}$.

∴ The numbers are not in proporation.

3

i) $\frac{x}{4} = \frac{9}{12}$

Cross product

$12 \times x = 9 \times 4$

$x = \frac{9 \times 4}{12} = \frac{36}{12}$

$\boxed{x = 3}$

ii) $\quad \frac{1}{13} : x :: \frac{1}{2} : \frac{1}{5}$

$\Rightarrow \quad \frac{1}{13} : x = \frac{1}{2} : \frac{1}{5}$

$$\frac{1/13}{x} = \frac{1/2}{1/5}$$

$$\frac{1}{13 \times x} = \frac{1}{2} \times 5$$

$$\frac{1}{13 x} = \frac{5}{2}.$$

Cross multiplication

$$2 \times 1 = 13 x \times 5$$

$$65 x = 2$$

$$\boxed{x = 2/65}$$

iii) $3.6 : 0.4 = x : 0.5$

$$\frac{3.6}{0.4} = \frac{x}{0.5}$$

$$\frac{3.6 \times 10}{0.4 \times 10} = \frac{x \times 10}{0.5 \times 10}$$

$$\frac{\overset{9}{\cancel{36}}}{\underset{1}{\cancel{4}}} = \frac{10 x}{5}$$

$$9 = \frac{10 x}{5}.$$

$$10x = 9 \times 5$$

$$x = \frac{9 \times 5}{10} = \frac{45}{10}$$

$$\boxed{x = 4 \cdot 5}$$

4. If a, b, c and d are in proportion then $ad = bc$

d is the fourth proportion

i) $a = 42 : b = 12 : c = 7 : d = ?$

$$42 \times d = 12 \times 7$$

$$42d = 84$$

$$d = \frac{84}{42}$$

$$d = 2 \text{ is fourth proportion}$$

ii) $a = \frac{1}{3}, b = \frac{1}{4}, c = \frac{1}{5}, d = ?$

$$\frac{1}{3} \times d = \frac{1}{4} \times \frac{1}{5}$$

$$\frac{d}{3} = \frac{1}{20}$$

$$d = \frac{3}{20} \text{ . is fourth proportion}$$

iii) $a = 3, b = 12, c = 15, d = ?$

$$3 \times d = 12 \times 15$$

$$d = \frac{12 \times \cancel{15}^{5}}{\cancel{3}}$$

$$d = 12 \times 5$$

$$d = 60 \quad \text{is fourth proportion.}$$

5. Continued proportion

If a, b, c are said to be in Continued proportion

if $a:b = b:c$ i.e $b^2 = ac$.

$$a = 7, b = 49, c = 343$$

$$b^2 = 49^2 = 2401$$

$$ac = 7 \times 343 = 2401$$

$$\therefore b^2 = ac$$

$\therefore$ They are said to be in Continued proportion.

6. As we know $b^2 = ac$ if a, b, c are in proportion

Third proportion, $c = \frac{b^2}{a}$.

i) $a = 36 : b = 18, c = ?$

$$C = \frac{18^2}{36}$$

$$C = \frac{18 \times 18}{36}$$

$C = 9$ is Third proportion

ii) $\quad a = 5\frac{1}{4} = \frac{21}{4} \quad ; b = 7 \quad ; c = 9$

$$C = \frac{7^2}{(21/4)}$$

$$C = \frac{7 \, 49 \times 4}{21 \, 3}$$

$$C = \frac{28}{3} \quad \text{is Third proportion.}$$

iii) $\quad a = 3.2 = \frac{32}{10} = \frac{16}{5} \quad , \quad b = 0.8 = \frac{8}{10} = \frac{4}{5}$

$$C = \frac{(4/5)^2}{(16/5)}$$

$$= \frac{16}{255} \times \frac{5}{16}$$

$C = \frac{1}{5} \quad$ is Third proportion

7.   Given   Ratio of length to width is $7:5$

         Width of sheet $= 20.5\,cm$

         Length of sheet $= ?$

$$\frac{Length}{width} = \frac{7}{5}$$

$$\frac{Length}{20.5} = \frac{7}{5}$$

$$Length = \frac{7}{\cancel{5}^{}} \times \cancel{20.5}^{4.1}$$

$$Length = 28.7\,cm$$

8.

      Amit age is   4 years 8 months

$$i.e \left(4 + \frac{8}{12}\right) year$$

$$= 4\frac{2}{3}\ years = \frac{14}{3}\ years.$$

Ages of Amit and Archana are In ratio $4:5$

$$i.e \quad \frac{Amit}{Archana} = \frac{4}{5}$$

$$\frac{14/3}{Archana} = \frac{4}{5}$$

$$Archana\ age = \frac{\cancel{14}^{7}}{3} \times \frac{5}{\cancel{4}^{2}} = \frac{35}{6}\ years.$$

∴ Archana's age is 5 years 10 months

Since $\dfrac{35}{6} \times \dfrac{2}{2} = \dfrac{70}{12}$

$$12\overline{)70}\ (5$$
$$\underline{60}$$
$$10$$

$\dfrac{70}{12} = 5\dfrac{10}{12}$ years

i.e 5 years 10 months.

∴ Archana's age is 5 years 10 months.

EXERCISE : 6.3

1. Cost of 6 bowls = ₹ 90.

   Then cost of 10 such bowls = ?

   Let cost of 10 bowls = ₹ x.

   i.e $\dfrac{x}{90} = \dfrac{10}{6}$

   $x = \dfrac{\overset{5}{\cancel{10}} \times \overset{30}{\cancel{90}}}{\underset{1}{\cancel{\cancel{6}}}}$

   $x = ₹ 150$.

   ∴ Cost of 10 such bowls = ₹ 150.

2. With the cost of ₹ 15, we bought = 10 pencils.

   Then with the cost of ₹ 72, we bought = ? pencils

   Let it be = x pencils.

   i.e $\dfrac{x}{10} = \dfrac{72}{15}$

   $x = \dfrac{72 \times 10}{15}$

   $x = \dfrac{720}{15}$

   $x = 48$ pencils

3.

Given 400 grams Cake Costs ₹ 80.

Then 1·5 kg Cake Cost = ?

Let the Cost be ₹ x.

i.e $\dfrac{x}{80} = \dfrac{1·5\ kg}{400}$

$\dfrac{x}{80} = \dfrac{1·5 \times 1000}{400}$

$x = \dfrac{1500 \times \overset{20}{\cancel{80}}}{\underset{1}{\cancel{400}}}$

$x = 15 \times 20$

$x = ₹\ 300$

∴ 1·5 kg Cake Cost = ₹ 300·

4. i) In 3 months, a man earns ₹ 18000

In x months, a man earns ₹ 30,000.

i.e $\dfrac{x}{3} = \dfrac{30,000}{18000}$

$x = \dfrac{30 \times 3}{18} = \dfrac{90}{18}$

$x = 5$

∴ In 5 months, a man earns ₹ 30,000.

ii) In 3 months, he earns ₹18,000

Let In 7 months, he earns ₹ x.

$$\therefore \frac{x}{18,000} = \frac{7}{3}$$

$$x = \frac{7 \times \overset{6000}{\cancel{18,000}}}{\cancel{3}}$$

$$x = 7 \times 6,000$$

$$x = 42,000$$

∴ In 7 months, he earns ₹ 42,000.

5.

Given 12 mangoes weigh 2.4 kg.

then 8 mangoes weigh x kg

$$\therefore \frac{x}{2.4} = \frac{8}{12}$$

$$x = \frac{8 \times 2.4}{12}$$

$$x = \frac{8 \times \overset{2}{\cancel{24}}}{\cancel{12} \times 10} = \frac{16}{10}$$

$$\boxed{x = 1.6 \text{ kg}}$$

∴ 8 mangoes weigh 1.6 kg

6. Given   12 sheets of thick paper = 40 grams.

   Let x sheets of thick paper = $2\frac{1}{2}$ kg

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

   $\therefore \quad \dfrac{x}{12} = \dfrac{5/2 \text{ kg}}{40 \text{ g}}$

   $\dfrac{x}{12} = \dfrac{\frac{5}{2} \times \overset{500}{\cancel{1000}} \text{ g}}{40 \text{ g}}$

   $\dfrac{x}{12} = \dfrac{5 \times \overset{125}{\cancel{500}}}{\underset{10}{40}}$

   $\dfrac{x}{12} = \dfrac{5 \times 125}{10}$

   $x = \dfrac{\overset{1}{\cancel{5}} \times 125 \times \overset{6}{\cancel{12}}}{\cancel{10}}$

   $\boxed{x = 750}$

7. For a distance of 90 km, a bus consumes = 25 litres

   Let For a distance of 288 km, a bus consumes = x litres

   $\therefore \quad \dfrac{x}{25} = \dfrac{288}{90}$

   $x = \dfrac{\overset{32}{\cancel{288}} \times 25}{\underset{10}{\cancel{90}}}$

$$x = \frac{\overset{16}{\cancel{32}} \times 2\cancel{5}5}{\cancel{10}\cancel{2}}$$

$$x = 16 \times 5$$

$$\boxed{x = 80 \text{ litres}}$$

∴ For a distance of 288 km, a bus consumes = 80 litres

8. Given $\frac{4}{5}$ metre cloth costs ₹ 36

Then $2\frac{1}{5}$ metre cloth costs ₹ x

$$2\frac{1}{5} = 2 + \frac{1}{5} = \frac{10+1}{5} = \frac{11}{5}$$

$$\therefore \frac{x}{36} = \frac{11/5}{4/5}$$

$$\frac{x}{36} = \frac{11}{\cancel{8}} \times \frac{\cancel{8}}{4}$$

$$\frac{x}{36} = \frac{11}{4}$$

$$x = \frac{11}{\cancel{4}} \times \cancel{36}^{9}$$

$$\boxed{x = 99}$$

∴ $2\frac{1}{5}$ metre cloth costs ₹ 99

9. Given 15 men can pack 540 parcels per day

   Let x men can pack 396 parcels per day

   i.e $\dfrac{x}{15} = \dfrac{396}{540}$

   $x = \dfrac{396 \times 15}{540}$

   $\boxed{x = 11}$

   ∴ 11 men can pack 396 parcels per day

10. Given 12 kg potatoes costs ₹ 132

    Then 1 kg potatoes costs ₹ x

    i.e $\dfrac{x}{132} = \dfrac{1}{12}$

    $x = \dfrac{132 \times 1}{12}$

    $\boxed{x = ₹11}$

    ∴ 1 kg potatoes costs ₹ 11

    Given 16 kg potatoes costs ₹ 168

    Then 1 kg potatoes costs ₹ ?

    Let the cost ₹ x.

i.e $\dfrac{x}{168} = \dfrac{1}{16}$

$$x = \dfrac{\cancel{168}\,21}{\cancel{16}\,2}$$

$$x = ₹\dfrac{21}{2}$$

$$\boxed{x = ₹10.5}$$

∴ 1 kg potatoes = ₹10.5

Compared to 1ˢᵗ case, 2ⁿᵈ case is better buy

EXERCISE : 6·4

$$1 \text{ km/h} = \frac{5}{18} \text{ m/sec}$$

i) $72 \text{ km/h} = \overset{4}{\cancel{72}} \times \frac{5}{\cancel{18}} = 4 \times 5 = 20 \text{ m/sec}$

ii) $9 \text{ km/h} = 9 \times \frac{5}{\underset{2}{\cancel{18}}} = \frac{5}{2} \text{ m/sec} = 2.5 \text{ m/sec}$

iii) $1.2 \text{ km/min} = 1.2 \times \frac{1000 \text{ m}}{60 \text{ sec}} = \frac{1200}{60} \text{ m/sec} = 20 \text{ m/sec}$

iv) $600 \text{ m/hour} = \cancel{600} \times \frac{1}{\cancel{60} \times 60} \text{ m/sec} = \frac{1}{6} \text{ m/sec}$

2. $1 \text{ m/sec} = \frac{18}{5} \text{ km/h}$

i) $15 \text{ m/sec} = \overset{3}{\cancel{15}} \times \frac{18}{\underset{1}{\cancel{5}}} \text{ km/h} = 54 \text{ km/h}$

ii) $1.5 \text{ m/sec} = \frac{\overset{3}{\cancel{15}}}{10} \times \frac{18}{\underset{1}{\cancel{5}}} \text{ km/h} = \frac{54}{10} \text{ km/h} = 5.4 \text{ km/h}.$

3. $30 \text{ m/sec} = \overset{6}{\cancel{30}} \times \frac{18}{\cancel{5}} \text{ km/h} = 108 \text{ km/h}.$

   Since , $108 \text{ km/h} > 30 \text{ km/h}$

   So, $30 \text{ m/sec} > 30 \text{ km/h}.$

4. i)   Given speed of aeroplane = 720 km/h

   also Distance between two cities = $1800 \text{ km}.$

We know, Time = $\dfrac{Distance}{Speed}$

$$= \dfrac{1800}{720} \text{ hour}$$

$$= \dfrac{5}{2} \text{ hours}$$

Time = $2\dfrac{1}{2}$ hours

ii) Here Time = 40 min, Speed = 720 km/h

$$= \dfrac{\overset{12}{\cancel{720}} \times 1000 \text{ km}}{60 \text{ min}}$$

$$= 12,000 \text{ m/min}$$

Now Distance = Speed × Time

$$= 12,000 \times 40 \text{ m}$$

$$= 480000 \text{ m}$$

$$= \dfrac{480000}{1000} \text{ km}$$

Distance = 480 km

iii) Given Time = 15 sec, Speed = 720 km/h

$$= \overset{40}{\cancel{720}} \times \dfrac{5}{18} \text{ m/sec}$$

$$= 200 \text{ m/sec}$$

Distance = Speed × Time

$$= 15 \times 200 \text{ m}$$

$$= 3000 \text{ m}$$

$$= \frac{3000}{1000} \text{ km}$$

$$\therefore \text{ Distance} = 3 \text{ km}$$

5. Given Speed $= 6 \text{ km/h}$

$$= \frac{6 \times 1000 \text{ m}}{\overset{6}{\underset{1}{\cancel{60}}} \text{ min}}$$

$$= 100 \text{ m/min}$$

i) Distance $= $ Speed $\times$ Time

$$= 100 \times 5$$

$$= 500 \text{ metres}$$

$$= 0.5 \text{ km}$$

ii) $\quad \text{Time} = \dfrac{\text{Distance}}{\text{Speed}} = \dfrac{200}{100}$

$$\text{Time} = 2 \text{ min}$$

6. Given Distance $= 50 \text{ metres}$

$$= \frac{50}{1000} \text{ km}$$

$$= 0.05 \text{ km}$$

$$= \frac{1}{20} \text{ km}$$

Total Distance $= 2 \times \dfrac{1}{20} \text{ km} = \dfrac{1}{10} \text{ km}$

Time taken = 5 min

$$= \frac{5}{60} \text{ hours}$$

Now, Speed $= \dfrac{Distance}{Time}$

$$= \frac{(1/10) \text{ km}}{(5/60) \text{ hours}}$$

$$= \frac{1}{\cancel{10}} \times \frac{\cancel{60}^{6}}{5}$$

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

Speed $= 1.2 \text{ km/h}$

7

Given Time $= 48$ minutes $= \dfrac{\cancel{48}^{4}}{\cancel{60}_{5}} \text{ hours}$

$$= \frac{4}{5} \text{ hours.}$$

Speed $= 50 \text{ km/h}$

Distance $=$ Speed $\times$ Time

$$= 50 \times \frac{4}{5}$$

$$= 40 \text{ km .}$$

Time $= ?$; Speed $= 30 \text{ km/h}$

Time $= \dfrac{Distance.}{Speed}$

$$= \frac{40}{30} \text{ hours}$$

$$= \frac{4}{3} \text{ hours}$$

$$= \frac{4}{3} \times 60^{20} \text{ min}$$

$$\therefore \boxed{\text{Time} = 80 \text{ min}}$$