Chapter 9 Ratio and Proportion

VIII 9. Ratio and Proportion Exercise-9.1

Solution-01

We have,

$x : y = 3 : 5$

$\frac{x}{y} = \frac{3}{5}$

$5x = 3y \Rightarrow x = \frac{3y}{5}$

$\therefore 3x + 4y : 8x + 5y = \frac{3x3y}{5} + 4y : \frac{8x3y}{5} + 5y$

$= \frac{9y + 20y}{5} : \frac{24y + 25y}{5}$

$= \frac{29y}{5} : \frac{49y}{5}$

$= 29y : 49y.$

$= 29 : 49.$

Solution-02 :-

We have,

$x : y = 8 : 9$

$\Rightarrow \frac{x}{y} = \frac{8}{9}$

$\Rightarrow 9x = 8y$

$\therefore (7x - 4y) : 3x + 2y = 7 \times \frac{8y}{9} - 4y : 3 \times \frac{8y}{9} + 2y$

$= \frac{56y - 36y}{9} : \frac{42y}{9}$

$= 20 : 42 = 10 : 21.$

Solution - 03

Let the required numbers be $6x$ and $13x$

Then Their L.c.m is $78x$

$$78x = 312$$

$$\Rightarrow x = \frac{312}{78}$$

$$\Rightarrow x = 4$$

Thus,

The numbers are $6x = 6 \times 4 = 24$

$13x = 13 \times 4 = 52.$

solution-04:-

Let the required numbers be $3x$ and $5x$.

if 8 is added to each number

$$\therefore 3x+8 : 5x+8 = 2:3$$

$$\frac{3x+8}{5x+8} = \frac{2}{3}$$

$$\Rightarrow 3(3x+8) = 2(5x+8)$$

$$\Rightarrow 9x+24 = 10x+16$$

$$\Rightarrow 10x-9x = 24-16$$

$$\Rightarrow x = 8.$$

Thus,

The numbers are $3x = 3(8) = 24.$

$5(x) = 5(8) = 40.$

Solution-05.

Let the number to be added be x.

Then $\frac{7+x}{13+x} = \frac{2}{3}$

$\Rightarrow (7+x)3 = 2(13+x)$

$\Rightarrow 3x - 2x = 26 - 21$

$\Rightarrow x = 5$

Hence, the required number = 5

Solution-06:

Given that,

Three numbers are in the ratio 2:3:5

Sum of these numbers = 800

Sum of the terms of the ratio = 2+3+5
= 10.

$\therefore$ First number = $\frac{2}{10} \times 800$

= 160

Second number = $\frac{3}{10} \times 800$

= 240

Third number = $\frac{5}{10} \times 800$

= Rs 400.

Solution-07:

Let the required ages be $5x$ and $7x$.

If 18 years ago their ages ratio

$$\Rightarrow \frac{5x-18}{7x-18} = \frac{8}{13}$$

$$\Rightarrow 65x - 13 \times 18 = 8 \times 7x - 8 \times 18$$

$$\Rightarrow 65x - 234 = 56x - 144$$

$$\Rightarrow 65x - 56x = 234 - 144$$

$$\Rightarrow 9x = 90$$

$$\Rightarrow x = 10.$$

Thus,

The Ages are $5x = 50$ yrs

$7x = 70$ yrs

Solution-08:

Let the required numbers be $7x$ and $11x$.

if 7 is added to each of the numbers it becomes

$$\Rightarrow \frac{7x+7}{11x+7} = \frac{2}{3}$$

$$\Rightarrow 21x + 21 = 22x + 14$$

$$\Rightarrow x = 21 - 14 = 7$$

Thus,

The numbers are $7x = 7 \times 7 = 49$

$11x = 11 \times 7 = 77.$

Solution-09 :-

Two numbers are in the in the ratio = 2 : 7.

if sum of the numbers = 810.

we have,

Sum of the terms of the ratio = 2+7 = 9.

First number = $\frac{2}{9} \times 810$

$= 2 \times 90 = 180$

Second number = $\frac{7}{9} \times 810 = 7 \times 90 = 630.$

Solution-10:

We have,

Sum of the terms of the ratio = 2+3 = 5.

Ravish money = $\frac{2}{5} \times 1350$

$= 2 \times 270$

$= RS. 540.$

Shikha's money = $\frac{3}{5} \times 1350$

$= 3 \times 270$

$= RS. 810.$

Solution-11:-

we have,

sum of the terms in the ratio = 2+3+5=10.

$$P\text{-share} = \frac{2}{10} \times \text{Total money}$$

$$= \frac{2}{10} \times 2000$$

$$= 2 \times 200$$

$$= \text{Rs.}400.$$

$$Q\text{-share} = \frac{3}{10} \times 2000$$

$$= \text{Rs.}600$$

$$R\text{-share} = \frac{5}{10} \times 2000$$

$$= \text{Rs.}1000.$$

Solution-12:-

we have,

The boys and girls in the ratio 7:4.

Sum of the terms in the ratio = 7+4=11.

$$\text{Boys strength} = \frac{7}{11} \times 550 \quad [\text{Total strength} = 550]$$

$$= 7 \times 50 = 350.$$

Boys = 350

$$\text{girls} = \frac{4}{11} \times 550 = 4 \times 50$$

= 200 girls.

Solution-13.

It is given that.

The ratio of income and savings is 7:2.

Savings $\Rightarrow 2x = 500$

$\Rightarrow x = 250.$

$\therefore$ Income $= 7 \times x = 7 \times 250 = 1750.$

Expendicture = Income - savings

$= 1750 - 500$

$=$ Rs. 1250.

Solution-14:-

The sides of a triangle are in the ratio

$1 : 2 : 3$

Sum of the terms in the ratio $= 1+2+3 = 6.$

Perimiter $= 36$cm

first side $= \frac{1}{6} \times 36$cm

$= 6$cm

second side $= \frac{2}{6} \times 36$

$= 12$cm

Third side $= \frac{3}{6} \times 36$

$= 18$cm.

Solution-15:-

we have,

The sum of the terms in the ratio = 2+3=5.

Raman share = $\frac{2}{5} \times 5500$

$= 2 \times 1100$

$= Rs 2200$

Aman share = $\frac{3}{5} \times 5500$

$= \frac{3}{\cancel{5}_{1}} \times \cancel{5500}^{1100}$

$= Rs. 3300.$

Solution-16:-

we have,

The ratio of zinc and copper in an alloy = 7:9

weight of copper in the alloy = 11.7kg.

$\therefore 9x = 11.7 kg$

$\Rightarrow x = \frac{11.7 kg}{9}$

weigh of zinc in the alloy = $\cancel{0.9}^{1.3} \times 7$

$= 9.10 kg$

$\therefore$ weight of zinc = 9.10kg.

Solution-17:-

Given Ratio = 7 : 8.

Consequent $\Rightarrow 8x = 40$ [∵ second half in the Proposition]

$\Rightarrow x = \frac{40}{8}$

$\Rightarrow x = 5.$

antecedent $= 7x = 7 \times 5$

$= 35.$

Solution-18:-

ratio.-2:7.

The sum of the terms in the ratio=

$2+7 = 9.$

1^{st} ratio $= \frac{2}{9} \times 351$

$= 2 \times 39$

$= RS\ 78$

2^{nd} Ratio $= \frac{7}{9} \times 351$

$= 7 \times 39$

$= Rs\ 273.$

Solution-19:-

one score = 20.

Rs 16 per score.

Pencil cost = $\frac{16}{20}$

= Rs 0.80

Ball peneils dozen cost = Rs 8.40.

Ball pen cost = $\frac{8.40}{12}$

= Rs 0.70

Ratio of price of pencil to that of Ball Pen = $\frac{0.80}{0.70}$

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

Solution -20:-

Given.

one out of six students fails.

x out of 42 students

$\frac{1}{6} = \frac{x}{42} \Rightarrow x = \frac{42}{6} = 7.$

Students fails = 7 students

Pass students = Total - fail = 42 - 7 = 35.

Exercise-9.2.

Solution-01.

(i) 3 : 4 (or) 9 : 16.

Now, L.C.M of 4 and 16 is 16.

we have.

$\frac{3}{4} = \frac{3\times4}{4\times4} = \frac{12}{16}$ and $\frac{9}{16} = \frac{9}{16}$.

clearly $12 > 9$.

$\therefore \frac{3}{4} > \frac{9}{16}$

(ii) 15 : 16 or 24 : 25

Now, Lcm of 16 & 25 is = 400.

we have.

$15 : 16 = \frac{15\times25}{16\times25} = \frac{375}{400}$

$24 : 25 = \frac{24\times16}{25\times16} = \frac{384}{400}$

$\therefore \frac{384}{400} > 375$.

$\therefore \frac{384}{400} > \frac{375}{400}$ i.e $\frac{15}{16} < \frac{24}{25}$.

(iii) $4:7$ (or) $5:8$.

L.c.m of 7 and 8 is 56.

$4:7 = \frac{4\times 8}{7\times 8} = \frac{32}{56}$ & $\frac{5}{8} = \frac{5\times 7}{8\times 7} = \frac{35}{56}$

$35 > 32$

$\therefore \frac{35}{56} > \frac{32}{56}$ i.e $5:8 > 4:7$.

(iv) $9:20$ (or) $8:13$.

L.c.m of 20 and 13 is 260.

$9:20 = \frac{9\times 13}{20\times 13}$ & $\frac{8\times 20}{13\times 20} = \frac{160}{260}$

$\therefore \frac{160}{260} > \frac{117}{260}$.

$\therefore \frac{8}{13} > \frac{9}{20}$

(v) $1:2$ (or) $13:27$

L.c.m of 2 and 27 is 54.

$1:2 = \frac{1\times 27}{2\times 27}$ & $\frac{13\times 2}{27\times 2} = \frac{26}{54}$

$\therefore$ Clearly $27 > 26$

$\therefore \frac{1}{2} > \frac{13}{27}$

Exercise-9.3.

Solution-01:-

(i) we have,

$33:44 = \frac{3}{4}$ and $\frac{66}{88} = \frac{3}{4}$

$\therefore 33:44 = 66:88$

Hence, 33.44, 66, 88 are in proportion

(ii) we have.

$46:69 = \frac{2}{3}$ and $\frac{69}{46} = \frac{3}{2}$

$\therefore 46:69 \neq 69:46$

Hence, 46, 69, 69, 46 are not in proportion.

(iii) we have,

72, 84, 186, 217

$72:84 = \frac{6}{7}$ and $\frac{186}{217} = \frac{6}{7}$

Hence, 72, 84, 186 217 are in proportion

Solution -02:-

(i) $16 : 18 = x : 96$

$\Rightarrow \frac{16}{18} = \frac{x}{96}$

$\Rightarrow x = \frac{256}{3}$

(ii) $x : 92 = 87 : 116$

$\frac{x}{92} = \frac{87}{116}$

$x = \frac{3 \quad 23}{87 \times 92}$
$116 \quad 4$

$x = 69.$

Solution -03:

The ratio of income and expandicture
$= 7 : 6$

$7x = 1400$

$\Rightarrow x = 200$

expandicture $= 6x = 6 \times 200$
$= RS\ 1200$

Savings = Income - Expandicture
$= 1400 - 1200$
$= RS\ 200$