RD Sharma Solutions

Class 7

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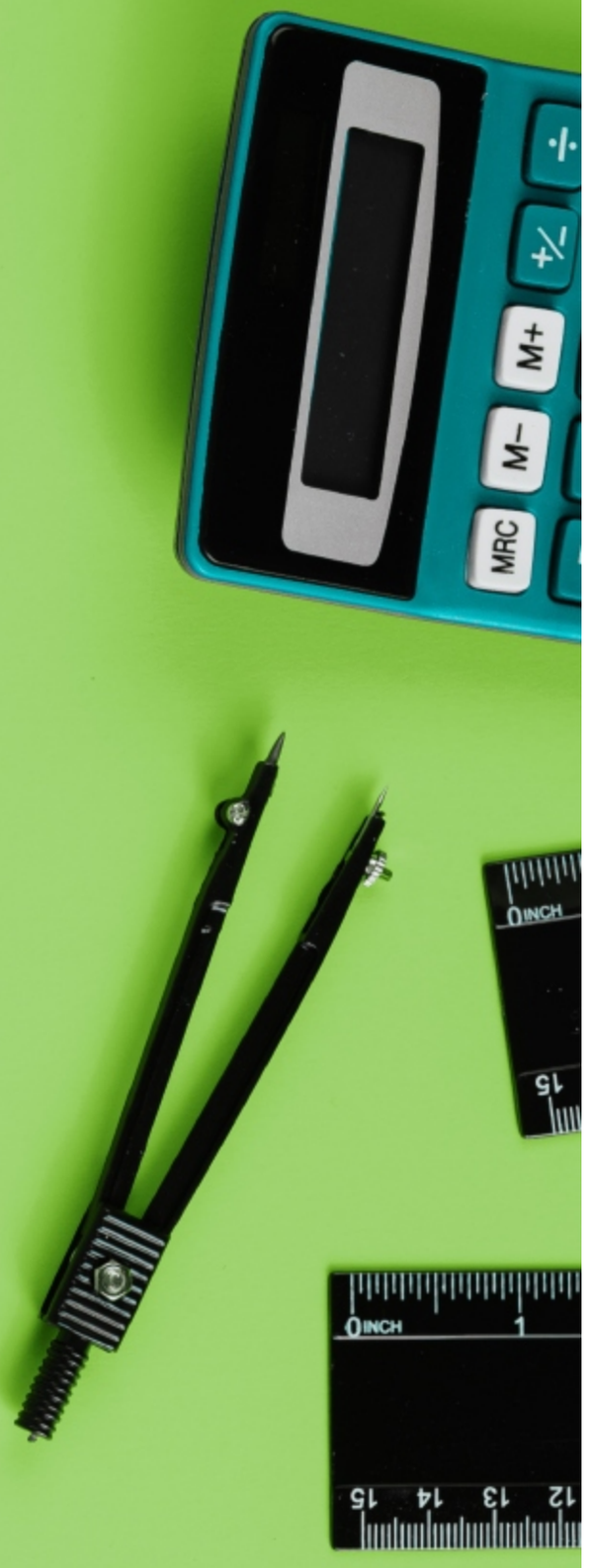

Chapter-9

Ratio and proportion

Exercise 9.1

Q.1 If $x : y = 3 : 5$, find the ratio $3x+4y : 8x+5y$

Solution: we have $x : y = 3 : 5 \Rightarrow \frac{x}{y} = \frac{3}{5}$

Now $\frac{3x+4y}{8x+5y}$

Dividing numerator and denominator by y, we get

$$\frac{\left(\frac{3x+4y}{y}\right)}{\left(\frac{8x+5y}{y}\right)} = \frac{3\left(\frac{x}{y}\right)+4}{8\left(\frac{x}{y}\right)+5} = \frac{3\left(\frac{3}{5}\right)+4}{8\left(\frac{3}{5}\right)+5}$$

$$= \frac{\left(\frac{9}{5}+4\right)}{\left(\frac{24}{5}+5\right)} = \frac{\frac{9+20}{5}}{\frac{24+25}{5}}$$

$$= \frac{\left(\frac{29}{5}\right)}{\left(\frac{49}{5}\right)} = \frac{29}{49}$$

$$= 29 : 49$$

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Q.2 If $x : y = 8 : 9$, Find the ratio

$(7x-4y) : (3x+2y)$

Solution: $\because \frac{x}{y} = \frac{8}{9}$

Now $\frac{7x-4y}{3x+2y} = \frac{\left(\frac{7x-4y}{y}\right)}{\left(\frac{3x+2y}{y}\right)}$ (Dividing numerator and denominator by y)

$$= \frac{7\left(\frac{x}{y}\right)-4}{3\left(\frac{x}{y}\right)+2} = \frac{7\left(\frac{8}{9}\right)-4}{3\left(\frac{8}{9}\right)+2}$$

$$= \frac{\left(\frac{56}{9}-4\right)}{\left(\frac{24}{9}+2\right)} = \frac{\frac{56-36}{9}}{\frac{24+18}{9}}$$

$$= \frac{\frac{20}{9}}{\frac{42}{9}} = \frac{20}{42} = \frac{10}{21}$$

$$= 10 : 21$$

Q.3 If two numbers are in the ratio $6 : 13$ and their LCM is 312, find the numbers.

Solution: Ratio of numbers $= 6 : 13$

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

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LCM of $6x$ and $13x = 78x$

$\Rightarrow 78x = 312$

$\Rightarrow x = \frac{312}{78} = 4$

Thus, numbers are $6x = 6 \times 4 = 24$

$13x = 13 \times 4 = 52$

Q4 Two numbers are in the ratio 3:5. If 8 is added to each number, the ratio becomes 2:3. Find the numbers.

Solution: Let the numbers be $3x$ and $5x$.

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

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

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

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

$\Rightarrow -x = -8 \Rightarrow x = 8$

Thus numbers are $3x = 3 \times 8 = 24$

$5x = 5 \times 8 = 40$

Q.5 What should be added to each term of the ratio 7:13 so that the ratio becomes 2:3.

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Solution : Let the number to be added is x

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

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

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

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

$\Rightarrow x = 5$

Hence, required no. be 5.

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(6) Three numbers are in the ratio 2:3:5 and the sum of these numbers is 800. Find the numbers.

Solution Let numbers be $2x, 3x, 5x$

Now, $2x+3x+5x = 800$

$\Rightarrow 10x = 800$

$\Rightarrow x = \frac{800}{10} = 80$

Thus numbers are $2x = 2\times 80 = 160$

$3x = 3\times 80 = 240$

$5x = 5\times 80 = 400$

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(7) The ages of two persons are in the ratio 5:7. Eighteen years ago their ages were in the ratio 8:13. Find their present ages.

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Solution: let ages of two persons be $5x$ and $7x$

eighteen years ago their ages will be

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

$$\Rightarrow 13(5x-18) = 8(7x-18)$$

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

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

$$\Rightarrow 9x = 90$$

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

$\therefore$ Present ages will be $5x = 5 \times 10 = 50$ years

$7x = 7 \times 10 = 70$ years

Q.8 Two numbers are in the ratio 7 : 11. If 7 is added to each of the numbers. The ratio becomes 2 : 3. Find the numbers.

Solution: let numbers be $7x$ and $11x$

According to question, $\frac{7x+7}{11x+7} = \frac{2}{3}$

$$\Rightarrow 3(7x+7) = 2(11x+7)$$

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

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

$$\Rightarrow -x = -7 \quad \therefore x = 7$$

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Thus the numbers are $7x = 7 \times 7 = 49$

$11x = 7 \times 11 = 77$

Q.9 Two numbers are in the ratio 2:7. If the sum of the numbers is 810, find the numbers

Solution: Let numbers be $2x$ and $7x$

$\because \quad 2x + 7x = 810$

$\Rightarrow \quad 9x = 810$

$\Rightarrow \quad x = \frac{810}{9} = 90$

Thus numbers are $2x = 2 \times 90 = 180$

$7x = 7 \times 90 = 630$

Q.10 Divide Rs 1350 between Ravish and Shikha in the ratio 2:3.

Solution: Total Amount = Rs. 1350

Let Ravish got = Rs $2x$

Shikha got = $3x$

$\because \quad 2x + 3x = 1350$

$\Rightarrow \quad 5x = 1350$

$\Rightarrow \quad x = \frac{1350}{5} = 270$

$\therefore$ Amount got by Ravish = 2×270 = Rs. 540

Amount got by Shikha = 3×270 = Rs. 810

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Q.11 Divide Rs 2000 among P, Q, R in the ratio 2:3:5.

Solution: Let amount got by P, Q and R be

$2x$, $3x$ and $5x$

$\because \quad 2x+3x+5x = 2000$

$\Rightarrow \quad 10x = 2000$

$\Rightarrow \quad x = \frac{2000}{10} = 200$

$\therefore$ Amount got by P $= 2x = 2 \times 200 =$ Rs. 400

Amount got by Q $= 3x = 3 \times 200 =$ Rs. 600

Amount got by R $= 5x = 5 \times 200 =$ Rs. 1000

Q.12 The boys and the girls in a school are in the ratio 7:4. If total strength of the school be 550. Find the number of boys and girls.

Solution: Ratio of boys and girls = 7:4

Let number of boys $= 7x$

number of girls $= 4x$

$\because \quad 7x+4x = 550$

$\Rightarrow \quad 11x = 550$

$x = \frac{550}{11} = 50$

$\therefore$ Number of boys $= 7 \times 50 = 350$

girls $= 4 \times 50 = 200$

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13 The ratio of monthly income to the savings of a family is 7:2. If the savings be of Rs. 500 find the income and expenditure.

Solution: Monthly Income : Savings = 7:2

let monthly income = $7x$

Savings = $2x$

$\because$ $2x = 500$

$x = \frac{500}{2} = 250$

$\therefore$ Monthly Income = $7x = 7 \times 250$ = Rs 1750

Expenditure = $2x = 2 \times 250$ = Rs. 500

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14 The sides of a triangle are in the ratio 1:2:3. If the perimeter is 36 cm. Find its sides.

Solution: let sides of triangle are x, $2x$ and $3x$

Perimeter = 36

$\Rightarrow$ $x + 2x + 3x = 36$

$\Rightarrow$ $6x = 36$

$\Rightarrow$ $x = \frac{36}{6} = 6$

Thus sides of triangle are $x = 6$ cm

$2x = 2 \times 6 = 12$ cm

$3x = 3 \times 6 = 18$ cm.

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Q.15 A sum of Rs 5500 is to be divided between Raman and Aman in the ratio 2:3. How much will each get?

Solution: $\because$ Sum of ratios $= 2+3 = 5$

$\therefore$ Amount got by Raman $= \frac{2}{5} \times 5500 =$ Rs 2200

Amount got by Aman $= \frac{3}{5} \times 5500 =$ Rs 3300

Q.16 The ratio of zinc and copper in an alloy is 7:9. If the weight of the copper in the alloy is 11.7 kg. Find the weight of the zinc in the alloy.

Solution: let weight of zinc $= 7x$ kg

weight of copper $= 9x$ kg

$\because 9x = 11.7$

$\Rightarrow x = \frac{11.7}{9} = 1.3$

Therefore, weight of zinc in the alloy

$= 7 \times 1.3$ kg

$= 9.1$ kg

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Q.17 In the ratio 7:8. If the consequent is 40. what is antecedent ?

Solution: Let consequent and antecedent are

$7x$ and $8x$

$\because 8x = 40$

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

$\therefore$ antecedent $= 7x = 7 \times 5 = 35$

Q.18 Divide Rs. 351 into two parts such that one may be to the other as 2:7.

Solution: Let parts are $2x$ and $7x$

$\because 2x + 7x = 351$

$\Rightarrow 9x = 351$

$\Rightarrow x = \frac{351}{9} = 39$

then two parts are $2x = 2 \times 39 = 78$

$7x = 7 \times 39 = 273$

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Q.19 Find the ratio of the price of pencil to that of a ball pen, if pencil costs Rs. 16 per score and ball pens cost Rs 8.40 per dozen.

Solution: one score = 20 pencils

cost per score = Rs. 16

$\therefore$ cost of 1 pencil $= \frac{16}{20} =$ Rs 0.80

Now, 1 dozen = 12 pens

cost = Rs. 8.40

$\therefore$ cost of 1 pen $= \frac{8.40}{12} = 0.70$ Rupees.

$\therefore$ Ratio of the price of pencil to that of ball pen

$= \frac{0.80}{0.70} = \frac{8}{7} = 8:7$

Q.20 In a class, one out of every six students fails. If there are 42 students in the class, how many pass?

Solution: Total students = 42

No. of students failed $= \frac{1}{6}$ of 42

$\therefore$ No. of students passed $= \frac{5}{6} \times 42$

= 35 students.

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