

## Access answers to Maths RD Sharma Solutions For Class 7 Chapter 9 – Ratio and Proportion

Exercise 9.1 Page No: 9.6

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

**Solution:**

Given  $x : y = 3 : 5$

We can write above equation as

$$x/y = 3/5$$

$$5x = 3y$$

$$x = 3y/5$$

By substituting the value of  $x$  in given equation  $3x + 4y : 8x + 5y$  we get,

$$3x + 4y : 8x + 5y = 3 (3y/5) + 4y : 8 (3y/5) + 5y$$

$$= (9y + 20y)/5 : (24y + 25y)/5$$

$$= 29y/5 : 49y/5$$

$$= 29y : 49y$$

$$= 29 : 49$$

**2. If  $x : y = 8 : 9$ , find the ratio  $(7x - 4y) : 3x + 2y$ .**

**Solution:**

Given  $x : y = 8 : 9$

We can write above equation as

$$x/y = 8/9$$

$$9x = 8y$$

$$x = 8y/9$$

By substituting the value of  $x$  in the given equation  $(7x - 4y) : 3x + 2y$  we get,

$$(7x - 4y) : 3x + 2y = 7 (8y/9) - 4y : 3 (8y/9) + 2y$$

$$= (56y - 36y)/9 : 42y/9$$

$$= 20y/9 : 42y/9$$

$$= 20y : 42y$$

$$= 20 : 42$$

$$= 10 : 21$$

**3. If two numbers are in the ratio 6: 13 and their L.C.M is 312, find the numbers.**

**Solution:**

Given two numbers are in the ratio 6: 13

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

The LCM of  $6x$  and  $13x$  is  $78x$

$$= 78x = 312$$

$$x = (312/78)$$

$$x = 4$$

Thus the numbers are  $6x = 6(4) = 24$

$$13x = 13(4) = 52$$

**4. 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 required numbers be  $3x$  and  $5x$

Given that if 8 is added to each other then ratio becomes 2: 3

$$\text{That is } 3x + 8: 5x + 8 = 2: 3$$

$$(3x + 8) / (5x + 8) = 2/3$$

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

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

By transposing

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

$$x = 8$$

Thus the numbers are  $3x = 3(8) = 24$

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

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

**Solution:**

Let the number to be added is  $x$

$$\text{Then } (7 + x) : (13 + x) = (2/3)$$

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

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

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

$$x = 5$$

Hence the required number is 5

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

**Solution:**

Given that three numbers are in the ratio 2: 3: 5 and sum of them is 800

Therefore sum of the terms of the ratio =  $2 + 3 + 5 = 10$

$$\text{First number} = (2/10) \times 800$$

$$= 2 \times 80$$

$$= 160$$

$$\text{Second number} = (3/10) \times 800$$

$$= 3 \times 80$$

$$= 240$$

$$\text{Third number} = (5/10) \times 800$$

$$= 5 \times 80$$

$$= 400$$

The three numbers are 160, 240 and 400

**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.**

**Solution:**

Let present ages of two persons be  $5x$  and  $7x$

Given ages of two persons are in the ratio 5: 7

And also given that 18 years ago their ages were in the ratio 8: 13

$$\text{Therefore } (5x - 18) / (7x - 18) = (8/13)$$

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

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

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

$$9x = 90$$

$$x = 90/9$$

$$x = 10$$

Thus the ages are  $5x = 5 (10) = 50$  years

And  $7x = 7 (10) = 70$  years

**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 the required numbers be  $7x$  and  $11x$

If 7 is added to each of them then

$$(7x + 7) / (11x + 7) = (2/3)$$

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

$$21x + 21 = 22x + 14$$

$$22x - 21x = 21 - 14$$

$$x = 21 - 14 = 7$$

Thus the numbers are  $7x = 7 (7) = 49$

And  $11x = 11 (7) = 77$

**9. Two numbers are in the ratio 2: 7. 11 the sum of the numbers is 810. Find the numbers.**

**Solution:**

Given two numbers are in the ratio 2: 7

And their sum = 810

$$\text{Sum of terms in the ratio} = 2 + 7 = 9$$

$$\text{First number} = (2/9) \times 810$$

$$= 2 \times 90$$

$$= 180$$

$$\text{Second number} = (7/9) \times 810$$

$$= 7 \times 90$$

$$= 630$$

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

**Solution:**

$$\text{Given total amount to be divided} = 1350$$

$$\text{Sum of the terms of the ratio} = 2 + 3 = 5$$

$$\text{Ravish share of money} = (2/5) \times 1350$$

$$= 2 \times 270$$

$$= \text{Rs. } 540$$

$$\text{And Shikha's share of money} = (3/5) \times 1350$$

$$= 3 \times 270$$

$$= \text{Rs. } 810$$

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

**Solution:**

$$\text{Given total amount to be divided} = 2000$$

$$\text{Sum of the terms of the ratio} = 2 + 3 + 5 = 10$$

$$\text{P's share of money} = (2/10) \times 2000$$

$$= 2 \times 200$$

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

$$\text{And Q's share of money} = (3/10) \times 2000$$

$$= 3 \times 200$$

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

$$\text{And R's share of money} = (5/10) \times 2000$$

$$= 5 \times 200$$

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

**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:**

$$\text{Given that boys and the girls in a school are in the ratio } 7:4$$

$$\text{Sum of the terms of the ratio} = 7 + 4 = 11$$

$$\text{Total strength} = 550$$

$$\text{Boys strength} = (7/11) \times 550$$

$$= 7 \times 50$$

$$= 350$$

$$\text{Girls strength} = (4/11) \times 550$$

$$= 4 \times 50$$

$$= 200$$

**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:**

Given that the ratio of income and savings is 7: 2

Let the savings be  $2x$

$$2x = 500$$

$$\text{So, } x = 250$$

Therefore,

$$\text{Income} = 7x$$

$$\text{Income} = 7 \times 250 = 1750$$

$$\text{Expenditure} = \text{Income} - \text{savings}$$

$$= 1750 - 500$$

$$= \text{Rs. } 1250$$

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

**Solution:**

Given sides of a triangle are in the ratio 1: 2: 3

$$\text{Perimeter} = 36\text{cm}$$

$$\text{Sum of the terms of the ratio} = 1 + 2 + 3 = 6$$

$$\text{First side} = \left(\frac{1}{6}\right) \times 36$$

$$= 6\text{cm}$$

$$\text{Second side} = \left(\frac{2}{6}\right) \times 36$$

$$= 2 \times 6$$

$$= 12\text{cm}$$

$$\text{Third side} = \left(\frac{3}{6}\right) \times 36$$

$$= 6 \times 3$$

$$= 18\text{cm}$$

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

**Solution:**

$$\text{Given total amount to be divided} = 5500$$

$$\text{Sum of the terms of the ratio} = 2 + 3 = 5$$

$$\text{Raman's share of money} = \left(\frac{2}{5}\right) \times 5500$$

$$= 2 \times 1100$$

$$= \text{Rs. } 2200$$

$$\text{And Aman's share of money} = \left(\frac{3}{5}\right) \times 5500$$

$$= 3 \times 1100$$

= Rs. 3300

**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:**

Given that ratio of zinc and copper in an alloy is 7: 9

Let their ratio =  $7x: 9x$

Weight of copper = 11.7kg

$$9x = 11.7$$

$$x = 11.7/9$$

$$x = 1.3$$

Weight of the zinc in the alloy =  $1.3 \times 7$

$$= 9.10\text{kg}$$

**17. In the ratio 7: 8. If the consequent is 40, what is the antecedent**

**Solution:**

Given ratio = 7: 8

Let the ratio of consequent and antecedent  $7x: 8x$

Consequent = 40

$$8x = 40$$

$$x = 40/8$$

$$x = 5$$

$$\text{Antecedent} = 7x = 7 \times 5 = 35$$

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

**Solution:**

Given total amount is to be divided = 351

Ratio 2: 7

The sum of terms =  $2 + 7$

$$= 9$$

$$\text{First ratio of amount} = (2/9) \times 351$$

$$= 2 \times 39$$

$$= \text{Rs. } 78$$

$$\text{Second ratio of amount} = (7/9) \times 351$$

$$= 7 \times 39$$

$$= \text{Rs. } 273$$

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

**Solution:**

One score contains 20 pencils

And cost per score = 16

Therefore pencil cost =  $16/20$

= Rs. 0.80

Cost of one dozen ball pen = 8.40

1 dozen = 12

Therefore cost of pen =  $8.40/12$

= Rs 0.70

Ratio of the price of pencil to that of ball pen =  $0.80/0.70$

=  $8/7$

= 8: 7

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

**Solution:**

Given, total number of students = 42

One out of 6 student fails

x out of 42 students

$16 = x/42$

$x = 42/6$

$x = 7$

Number of students who fail = 7 students

No of students who pass = Total students – Number of students who fail

=  $42 - 7$

= 35 students.

Exercise 9.2 Page No: 9.10

**1. Which ratio is larger in the following pairs?**

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

**(ii) 15: 16 or 24: 25**

**(iii) 4: 7 or 5: 8**

**(iv) 9: 20 or 8: 13**

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

**Solution:**

(i) Given 3: 4 or 9: 16

LCM for 4 and 16 is 16

3: 4 can be written as =  $3/4$

$3/4 \times (4/4) = 12/16$

And we have 9/16

Clearly  $12 > 9$

Therefore 3: 4 > 9: 16

(ii) Given 15: 16 or 24: 25

LCM for 16 and 25 is 400

15: 16 can be written as  $= 15/16$

$$15/16 \times (25/25) = 375/400$$

And we have 24/25

$$24/25 \times (16/16) = 384/400$$

Clearly  $384 > 375$

Therefore 15: 16 < 24: 25

(iii) Given 4: 7 or 5: 8

LCM for 7 and 8 is 56

4: 7 can be written as  $= 4/7$

$$4/7 \times (8/8) = 32/56$$

And we have 5/8

$$5/8 \times (7/7) = 35/56$$

Clearly  $35 > 32$

Therefore 4: 7 < 5: 8

(iv) Given 9: 20 or 8: 13

LCM for 20 and 13 is 260

9: 20 can be written as  $= 9/20$

$$9/20 \times (13/13) = 117/260$$

And we have 8/13

$$8/13 \times (20/20) = 160/260$$

Clearly  $160 > 117$

Therefore 9: 20 < 8: 13

(v) Given 1: 2 or 13: 27

LCM for 2 and 27 is 54

1: 2 can be written as  $= 1/2$

$$1/2 \times (27/27) = 27/54$$

And we have 13/27

$$13/27 \times (2/2) = 26/54$$

Clearly  $27 > 26$

Therefore 1: 2 > 13: 27

**2. Give the equivalent ratios of 6: 8.**

**Solution:**

Given 6: 8



By multiplying both numerator and denominator by 2 we equivalent ratios

$$6/8 \times (2/2) = 12/16$$

And also by dividing both numerator and denominator by 2 we equivalent ratios

$$(6/2)/(8/2) = 3/4$$

Two equivalent ratios are 3: 4 = 12: 16

**3. Fill in the following blanks:**

$$12/20 = \dots /5 = 9/\dots$$

**Solution:**

$$12/20 = 3/5 = 9/15$$

**Explanation:**

Consider  $12/20 = \dots /5$

Let unknown value be x

$$\text{Therefore } 12/20 = x/5$$

On cross multiplying

$$x = 60/20$$

$$x = 3$$

Consider  $12/20 = 9/\dots$

Let the unknown value be y

$$\text{Therefore } 12/20 = 9/y$$

On cross multiplying we get

$$y = 180/12$$

$$y = 15$$

Exercise 9.3 Page No: 9.13

**1. Find which of the following are in proportion?**

**(i) 33, 44, 66, 88**

**(ii) 46, 69, 69, 46**

**(iii) 72, 84, 186, 217**

**Solution:**

(i) Given 33, 44, 66, 88

$$\text{Product of extremes} = 33 \times 88 = 2904$$

$$\text{Product of means} = 44 \times 66 = 2904$$

Therefore product of extremes = product of means

Hence given numbers are in proportion.

(ii) Given 46, 69, 69, 46

Product of extremes =  $46 \times 46 = 2116$

Product of means =  $69 \times 69 = 4761$

Therefore product of extremes is not equal to product of means

Hence given numbers are not in proportion.

(iii) Given 72, 84, 186, 217

Product of extremes =  $72 \times 217 = 15624$

Product of means =  $84 \times 186 = 15624$

Therefore product of extremes = product of means

Hence given numbers are in proportion.

**2. Find x in the following proportions:**

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

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

**Solution:**

(i) Given 16: 18 = x: 96

In proportion we know that product of extremes = product of means

$$16/18 = x/96$$

On cross multiplying

$$x = (18 \times 96) / 16$$

$$x = 256/3$$

(ii) Given x: 92 = 87: 116

In proportion we know that product of extremes = product of means

$$x/92 = 87/116$$

On cross multiplying

$$x = (87 \times 92) / 116$$

$$x = 69$$

**3. The ratio of income to the expenditure of a family is 7: 6. Find the savings if the income is Rs.1400.**

**Solution:**

Given that income = 1400

Given the ratio of income and expenditure = 7: 6

$$7x = 1400$$

Therefore  $x = 200$

$$\text{Expenditure} = 6x = 6 \times 200 = \text{Rs.}1200$$

Savings = Income – Expenditure

$$= 1400 - 1200$$

$$= \text{Rs.}200$$

**4. The scale of a map is 1: 4000000. What is the actual distance between the two towns if they are 5cm apart on the map?**

**Solution:**

Given that the scale of map = 1: 4000000

Let us assume the actual distance between towns is x cm

$$1: 4000000 = 5: x$$

$$x = 5 \times 4000000$$

$$x = 20000000 \text{ cm}$$

We know that 1km = 1000 m

$$1\text{m} = 100 \text{ cm}$$

Therefore

$$x = 200 \text{ km}$$

**5. The ratio of income of a person to his savings is 10: 1. If his savings for one year is Rs.6000, what is his income per month?**

**Solution:**

Given that the ratio of income of a person to his savings is 10: 1

Savings per year = 6000

Savings per month =  $6000/12$

$$= \text{Rs.}500$$

Then let income per month be x

$$x: 500 = 10:1$$

$$x = 500 \times 10$$

$$x = 5000$$

Income per month is Rs. 5000

**6. An electric pole casts a shadow of length 20 meters at a time when a tree 6 meters high casts a shadow of length 8 meters. Find the height of the pole.**

**Solution:**

Given that length electric pole shadow is 20m

Height of the tree: Length of the shadow of tree

Height of the pole: Length of the shadow of pole

$$x: 20 = 6: 8$$

$$x = 120/8$$

$$x = 15$$

Therefore height of the pole is 15 meters