

## EXERCISE 9.1

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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,

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

$$= (56y - 36y)/9 : (24y + 18y)/9$$

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

$$= 20y : 42y$$

$$= 20 : 42$$

$$= 10 : 21$$

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

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  $x$

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 =  $2 + 3 + 5 = 10$

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

$$= 2 \times 80$$

$$= 160$$

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

$$= 3 \times 80$$

$$= 240$$

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

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

Sum of terms in the ratio =  $2 + 7 = 9$

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

$$= 2 \times 90$$

$$= 180$$

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

$$= 7 \times 90$$

$$= 630$$

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

**Solution:**

Given total amount to be divided = 1350

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

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

$$= 2 \times 270$$

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

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:**

Given total amount to be divided = 2000

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

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

=  $2 \times 200$

= Rs. 400

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

=  $3 \times 200$

= Rs. 600

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

=  $5 \times 200$

= 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:**

Given that boys and the girls in a school are in the ratio 7:4

Sum of the terms of the ratio =  $7 + 4 = 11$

Total strength = 550

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

=  $7 \times 50$

= 350

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  $2x$

$2x = 500$

So,  $x = 250$

Therefore,

Income =  $7x$

Income =  $7 \times 250 = 1750$

$$\begin{aligned}\text{Expenditure} &= \text{Income} - \text{savings} \\ &= 1750 - 500 \\ &= \text{Rs.}1250\end{aligned}$$

**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

Perimeter = 36cm

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

First side =  $(1/6) \times 36$

= 6cm

Second side =  $(2/6) \times 36$

=  $2 \times 6$

= 12cm

Third side =  $(3/6) \times 36$

=  $6 \times 3$

= 18cm

**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:**

Given total amount to be divided = 5500

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

Raman's share of money =  $(2/5) \times 5500$

=  $2 \times 1100$

= Rs. 2200

And Aman's share of money =  $(3/5) \times 5500$

=  $3 \times 1100$

= 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 a 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

$$1/6 = x/42$$

$$x = 42/6$$

$$x = 7$$

Number of students who fail = 7 students

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

$$= 42 - 7$$

$$= 35 \text{ students.}$$