Exercise 9.1

Q1. If x: y=3:5, find the ratio 3x+4y:8x+5y.

x:y=3:5

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

5x=3y

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

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

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

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

$= 29y : 49y = 29 : 49$

Q2. If x: y=8:9, find the ratio (7x-4y):3x+2y.

x:y=8:9

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

9x=8y

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

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

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

$= 20 : 42$

$= 10 : 21$

Q3. If two numbers are in the ratio 6:13 and their L.C.M is 312, find the numbers.

Let the required numbers be 6x and 13x

Then their L.C.M is 78x

78x=312

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

x=4

Thus,

The numbers are

$6x = 6 \times 4 = 24 \quad 13x = 13 \times 4 = 52$

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

Let the required numbers be 3x and 5x

If 8 is added to each other

3x+8:5x+8=2:3

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

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

9x+24=10x+16

10x-9x=24-16

x=8

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

5x=5(8)=40

Q5. What should be added to each term of the ratio 7: 13 so that the ratio becomes 2: 3

Let the number to be added be x

Then

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

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

3x-2x=26-21

x=5

Hence the required number is 5

Q6. Three numbers are in the ratio 2: 3: 5 and the sum of these numbers is 800. Find the numbers

Given that

Three numbers are in ratio 2:3:5

Sum of these numbers=800

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

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

$= 160 Second\ number = \frac{3}{10} \times 800$

$= 240 Third\ number = \frac{5}{10} \times 800$

$= 400$

Q7. 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.

Let the required ages be 5x and 7x

18 years ago their age ratios

$\frac{5x-18}{7x-18} = \frac{8}{13}\ 65x - 13 \times 18 = 8 \times 7x - 8 \times 18$

65x-234=56x-144

65x-56x=234-144

9x=90

x=10

Thus the ages are 5x=5 $\times$ 10=50years

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

Q8. 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.

Let the required numbers be 7x and 11x

If 7 is added to each of the numbers it becomes

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

21x+21=22x+14

X=21-14=7

Thus

The numbers are 7x=7×7=49

11x=11×7=77

Q9. Two numbers are in the ratio 2: 7.11the sum of the numbers is 810. Find the numbers.

Two numbers are in theratio=2:7

Sum of the numbers=810

We have,

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

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

=2×90

=180

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

=7×90

=630

Q10. Divide Rs 1350 between Ravish and Shikha in the ratio 2: 3.

We have

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

Ravish money=$\frac{2}{5}$ × 1350

=2 × 270

=Rs.540

Shikha money=$\frac{3}{5}$ × 1350

=3 × 270

=Rs.810

Q11. Divide Rs 2000 among P, Q, R in the ratio 2:3:5.

We have

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

P-share=

$\frac{2}{10}$ × total money

$= \frac{2}{10}$ × 2000

$= 2 × 200$

$= Rs.400$

Q-share=

$\frac{3}{10}$ × total money

$= \frac{3}{10}$ × 2000

$= 3 × 200$

$= Rs.600$

R-share=

$\frac{5}{10}$ × total money

$= \frac{5}{10}$ × 2000

$= 5 × 200$

$= Rs.1000$

Q12. 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.

We have,

The boys and girls is in the ratio 7:4

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

Total strength=550

Boys strength=

$\frac{7}{11} \times 550$

$= 7 \times 50$

$= 350 \; boys$

Girls strength=

$\frac{4}{11} \times 550$

$= 4 \times 50$

$= 200 \; girls$

Q13. 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.

It is given that

The ratio of income and savings is 7:2

Savings

2x=500

So, x=250

Therefore,

$Income = 7 \times 250$

$= 1750$

Expenditure=Income-savings

=1750-500

=Rs.1250

Q14. The sides of a triangle are in the ratio 1 : 2 : 3. If the perimeter is 36cm, find its sides.

The sides of the triangle are in the ratio 1:2:3

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

Perimeter=36cm

First side=

$\frac{1}{6} \times 36$

$= 6cm$

Second side=

$\frac{2}{6} \times 36$

$= 12cm$

Third side=

$\frac{3}{6} \times 36$

$= 18cm$

Q15. A sum of Rs 5500 is to be divided between Raman and Amen in the rate 2: 3. How much will each get ?

We have,

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

Raman share=

$\frac{2}{5} \times 5500$

$= 2 \times 1100$

$= Rs.2200$

Aman share=

$\frac{3}{5} \times 5500$

$= 3 \times 1100$

$= Rs.3300$

Q16. The ratio of zinc and copper in an alloy is 7 : 9. It the weight of the copper in the alloy is 11.7 kg, find the weight of the zinc in the alloy.

We have,

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

Weight of copper in the alloy=11.7kg

9x=11.7kg

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

Weight of zinc in the alloy=1.3×7

=9.10kg

Therefore weight of zinc =9.10kg

Q17. In the ratio 7: 8. if the consequent is 40, what a the antecedent

Given ratio=7:8

Consequent

8x=40

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

x=5

antecedent=7x=7×5=35

Q18. Divide Rs 351 into two parts such that one may be to the other as 2 : 7.

Ratio=2:7

The sum of the terms in the ratio=2+7=9

First ratio=

$\frac{2}{9} \times 351$

$= 2 \times 39$

$= Rs.78$

Second ratio=

$\frac{7}{9} \times 351$

$= 7 \times 39$

$= Rs.273$

Q19. 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.

One score=20

It is Rs.16 per score for pencil

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

=Rs.0.80

Cost of one dozen ball pen=Rs. 8.40

Cost of one ball pen= $\frac{8.40}{12}$

=Rs.0.70

Ratio of price of pencil to that of ball pen= $\frac{0.80}{0.70}$

= $\frac{8}{7}$

Q20. In a class, one out of every six students fails. If there are 42 students in the class, how many pass?

Given,

One out of 6 student fails

X out of 42 students

$\frac{1}{6} = \frac{x}{42}$ $x = \frac{42}{6}$

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

Q1. Which ratio is larger in the following pairs?

(i) 3:4 or 9:16

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

We have

$$\frac{3}{4}$$

$$= \frac{3 \times 4}{4 \times 4}$$

$$= \frac{12}{16}$$

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 and 25 is 400

We have

$$15 : 16 = \frac{15 \times 25}{16 \times 25}$$

$$= \frac{375}{400}$$

$$24 : 25 = \frac{24 \times 16}{25 \times 16}$$

$$= \frac{384}{400}$$

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

$$\frac{15}{16} < \frac{24}{25}$$

(iii) 4:7 or 5:8

LCM of 7 and 8 is 56

$$4 : 7 = \frac{4 \times 8}{7 \times 8}$$

$$= \frac{32}{56}$$

$$5 : 8 = \frac{5 \times 7}{8 \times 7}$$

$$= \frac{35}{56}$$

$$\frac{35}{56} > \frac{32}{56}$$

$$\frac{5}{8} > \frac{4}{7}$$

5:8>4:7

(iv) 9:20 or 8:13

LCM of 20 and 13 is 260

$$9 : 20 = \frac{9 \times 13}{20 \times 13}$$

$$= \frac{160}{260}$$

$$8 : 13 = \frac{8 \times 20}{13 \times 20}$$

$$= \frac{117}{260}$$

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

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

(v) 1:2 or 13:27

LCM of 2 and 27 is 54

$$1 : 2 = \frac{1 \times 27}{2 \times 27}$$

$$= \frac{27}{54}$$

$$13 : 27 = \frac{13 \times 2}{27 \times 2}$$

$$= \frac{26}{54}$$

$$\frac{27}{54} > \frac{26}{54}$$

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

Q2. Give the equivalent ratios of 6:8.

Equivalent ratios of 6:8

$\frac{6 \times 2}{8 \times 2} = \frac{12}{16}$ (By multiplying numerator and denominator by 2)

=6:8

$\frac{\frac{6}{2}}{\frac{8}{2}} = \frac{3}{4} = 3 : 4$ (By dividing numerator and denominator by 2)

Two equivalent ratios

3:4=12:16

Q3. Fill in the following blanks: $\frac{12}{20} = \frac{\cdots}{5} = \frac{9}{\cdots}$

$\frac{12}{20} = \frac{x}{5}$

$x = \frac{60}{20}$

$x = 3$

$\frac{12}{20} = \frac{9}{y}$

$12y = 180$

$y = \frac{180}{12}$

$y = 15$

x=3 and y=15

Q1. Which of the following are in proportion?

(i) 33,44,66,88

We have,

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

Therefore $33 : 44 = 66 : 88$

Hence 33,44,66,88 are in proportion

(ii) 46,69,69,46

We have,

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

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

(iii) 72,84,186,217

We have,

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

Therefore $72 : 84 = 186 : 217$

Hence 72,84,186,217 are in proportion

Q2. Find x in the following proportions

(i) 16:18=x:96

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

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

(ii) x:92=87:116

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

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

$$x = 69$$

Q3. The ratio of income to the expenditure of a family is 7:6. Find the savings if the income is Rs.1400.

The ratio of income and expenditure=7:6

7x=1400

x=200

Expenditure=6x=6 × 200=Rs.1200

Savings= Income-Expenditure

=1400-1200

=Rs.200

Q4. 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?

The scale of map=1:4000000

Let us assume the actual distance between towns is x cm

1:4000000=5:x

x=5 × 4000000=20000000cm

1km=1000m

1m=100cm

Therefore

x=200km

Q5. 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?

The ratio of income of a person to his savings is 10:1

Savings per month= $\frac{6000}{12}$

=Rs.500

Then let income per month be x

x:500=10:1

x=500 $\times$ 10

x=5000

Q6. An electric pole casts a shadow of length 20 metres at a time when a tree 6 metres high casts a shadow of length 8 metres. Find the height of the pole

Height of the tree: Length of the shadow of tree

Height of the pole: Length of the shadow of pole

x:20=6:8

$x = \frac{120}{8}$

x=15