

Board – CBSE

Class – 7th

Topic – Rational Number

Q.1 Express each of the following ratios in simplest form: $6\frac{2}{3} : 7\frac{1}{2}$

Ans. $\frac{20}{3} : \frac{15}{2} = 40 : 45$

The HCF of 40 and 45 is 5.

$$\therefore 40 : 45 = \frac{40 \div 5}{45 \div 5} = \frac{8}{9} = 8 : 9$$

Hence, $6\frac{2}{3} : 7\frac{1}{2}$ in its simplest form is 8 : 9

Q.2 Express each of the following ratios in simplest form: 1 hour 5 minutes : 45 minutes

Converting both the quantities into the same unit

Ans. $65 \text{ min} : 45 \text{ min} = \frac{65 \div 5}{45 \div 5} = \frac{13}{9}$ (\because HCF of 65 and 45 = 5) = 13 min : 9 min

Q.3 If $A : B = 5 : 8$ and $B : C = 16 : 25$, find $A : C$.

Ans. $\frac{A}{B} = \frac{5}{8}$ and $\frac{B}{C} \times = \frac{5}{25} \Rightarrow \frac{A}{C} = \frac{2}{5}$

Now, We have: $\frac{A}{B} \times \frac{B}{C} = \frac{5}{8} \times \frac{16}{25} \Rightarrow \frac{A}{C} = \frac{2}{5}$

$$\therefore A : C = 2 : 5$$

Q.4 What number must be subtracted from each term of ratio 17 : 33 so that the ratio becomes 7 : 15?

Ans. Suppose that x is the number that must be subtracted.

Then, $(17 - x) : (33 - x) = 7 : 15$

$$\Rightarrow \frac{17-x}{33-x} = \frac{7}{15}$$

$$\Rightarrow 255 - 15x = 231 - 7x \Rightarrow 8x = 255 - 231 = 24 \Rightarrow x = 3$$

Hence, 3 must be subtracted from each term of ratio 17 : 33 so that it becomes 7 : 15.

Q.5 Two numbers are in the ratio 7 : 11. If added to each of the numbers, the ratio becomes 2 : 3. Find the numbers.

Ans. Suppose that the numbers are $7x$ and $11x$.

$$\text{Then, } (7x + 7) : (11x + 7) = 2 : 3$$

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

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

$$\Rightarrow x = 7$$

Hence, the numbers are $(7 \times 7 =) 49$ and $(11 \times 7 =) 77$.

Q.6 If $8 : x :: 16 : 35$, find the value of x .

Ans. Product of the extremes = $8 \times 35 = 280$

$$\text{Product of the means} = 16 \times x = 16x$$

Since $8 : x :: 16 : 35$, we have:

$$\text{Product of the extremes} = \text{Product of the means}$$

$$\Rightarrow 280 = 16x$$

$$\Rightarrow x = 17.5$$

Q.7 Find the fourth proportional to the numbers: 8, 36, 6

Ans. Let the fourth proportional be x .

$$\text{Then, } 8 : 36 :: 6 : x$$

$$8 \times x = 36 \times 6 \quad [\text{Product of extremes} = \text{Product of means}]$$

$$\Rightarrow 8x = 216$$

$$\Rightarrow x = 27$$

Hence, the fourth proportional is 27.

Q.8 If the third proportional to 7 and x is 28, find the value of x .

Ans. The third proportional to 7 and x is 28.

$$\text{Then, } 7 : x :: x : 28$$

$$\Rightarrow 7 \times 28 = x^2 \quad (\text{Product of extremes} = \text{Product of means})$$

$$\Rightarrow x = 14$$

Q.9 The scale of a map is $1 : 5000000$. What is the actual distance between two towns, if they are 4 cm apart on the map?

Ans. Distance represented by 1 cm on the map = 5000000 cm = 50 km

Distance represented by 3 cm on the map = 50×4 km = 200 km

\therefore The actual distance is 200 km.

Q.10 If $A : B = 2 : 3$ and $B : C = 4 : 5$, then $C : A = ?$

Ans. $\frac{A}{B} = \frac{2}{3}$ $\frac{B}{C} = \frac{4}{5}$

Then, $\frac{A}{B} \times \frac{B}{C} = \frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$

Hence, $C : A = 15 : 8$

Q.11 If $A = \frac{1}{3} B$ and $B = \frac{1}{2} C$, then $A : B : C = ?$

Ans. $A = \frac{1}{3} B$

$C = 2B$

$\therefore A : B : C = \frac{1}{3} B : B : 2B = 1 : 3 : 6$

Q.12 What least number is to be subtracted from each term of the ratio 15 : 19 to make the ratio 3 : 4?

Ans. Suppose that x is the number that is to be subtracted.

Then, $(15 - x) : (19 - x) = 3 : 4$

$\Rightarrow \frac{15-x}{19-x} = \frac{3}{4}$

Cross multiplying, we get:

$$60 - 4x = 57 - 3x$$

$$\Rightarrow x = 3$$

Q.13 The boys and girls in a school are in the ratio 8 : 5. If the number of girls is 160, what is the total strength of the school?

Ans. Let x be the number of boys.

Then, $8 : 5 = x : 160$

$$\Rightarrow \frac{8}{5} = \frac{x}{160}$$

$$\Rightarrow x = \frac{8 \times 160}{5} = 256$$

\therefore Total strength of the school = $256 + 160 = 416$

Q.14 If $\frac{A}{2} = \frac{B}{3} = \frac{C}{4}$ then $A : B : C = ?$

Ans. $A = \frac{2}{3} B$

$C = \frac{4}{3} B$

$\therefore A : B : C = \frac{3}{2} B : B : \frac{4}{3} B$

$= 2 : 3 : 4$

Q.15 If $(x : y) = 3 : 4$, then $(7x + 3y) : (7x - 3y) = ?$

Ans. We have $X = \frac{3}{4} y$

Now, $\frac{7x+3y}{7x-3y} = \frac{7 \times \frac{3}{4} y + 3y}{7 \times \frac{3}{4} y - 3y}$

$= \frac{21x+12y}{21y-12y}$

$= \frac{33y}{9y} = \frac{11}{3}$