Ratio and Proportion
Exercise 8C

Q1

Answer :

The correct option is (d).

$$\frac{a}{c} = \frac{a}{b} \times \frac{b}{c} = \frac{3}{4} \times \frac{8}{9}$$
$$= \frac{2}{3}$$

Hence, $a : c = 2 : 3$

Q2

Answer :

(a) 15 : 8

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

Q3

Answer :

The correct option is (d).

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

$$\therefore A : C = \frac{A}{C} = \frac{\frac{3B}{2}}{\frac{4B}{5}} = \frac{15}{8}$$

Hence, $A : C = 15 : 8$

Q4

Answer :

The correct option is (b).

$$\frac{15}{100}A = \frac{20}{100}B$$
$$\Rightarrow \frac{A}{B} = \frac{4}{3}$$

Hence, $A : B = 4 : 3$

Q5

Answer :

(a) $1 : 3 : 6$

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

Q6

Answer :

(b) $30 : 42 : 77$

$$\frac{A}{B} = \frac{5}{7}$$
$$\Rightarrow A = \frac{5B}{7} \quad \frac{B}{C} = \frac{6}{11} \Rightarrow C = \frac{11B}{6}$$
$$\therefore A : B : C = \frac{5B}{7} : B : \frac{11B}{6} = 30 : 42 : 77$$

Q7

Answer :

(c) $6 : 4 : 3$

$$2A = 3B = 4C$$
Then, $A = \frac{3B}{2}$ and $C = \frac{3B}{4}$
$$\therefore A : B : C = \frac{3B}{2} : B : \frac{3B}{4} = 6 : 4 : 3$$

Q8

Answer :

(a) $3 : 4 : 5$

$$A = \frac{3B}{4}$$
$$C = \frac{5B}{4}$$
$$\therefore A : B : C = \frac{3B}{4} : B : \frac{5B}{4}$$

$$= 3 : 4 : 5$$

Q9

Answer :

(b) $15 : 10 : 6$

$$\frac{1}{x} : \frac{1}{y} = 2 : 3$$
Then, $y : x = 2 : 3$ and $y = \frac{2}{3}x$
$$\frac{1}{y} : \frac{1}{z} = 3 : 5$$
Then, $z : y = 3 : 5$ and $z = \frac{3}{5}y$
$$\therefore x : y : z = x : \frac{2}{3}x : \frac{3}{5}y = x : \frac{2}{3}x : \frac{3}{5} \times \frac{2}{3}x$$
$$= x : \frac{2}{3}x : \frac{2}{5}x = 15 : 10 : 6$$

Q10

Answer :

$$\frac{x}{y} = \frac{3}{4}$$

$$x = \frac{3y}{4}$$

$$\therefore \frac{7x + 3y}{7x - 3y} = \frac{7\frac{3y}{4} + 3y}{7\frac{3y}{4} - 3y}$$

$$= \frac{21y + 12y}{21y - 12y} = \frac{33y}{9y} = \frac{11}{3}$$

Hence, $(7x + 3y) : (7x - 3y) = 11 : 3$

The correct option is (c).

Q11

Answer :

(c) 5 : 2

$$\frac{3a + 5b}{3a - 5b} = \frac{5}{1}$$
$$3a + 5b = 15a - 25b$$
$$12a = 30b$$
$$\frac{a}{b} = \frac{30}{12} = \frac{5}{2}$$

$\therefore a : b = 5 : 2$

Q12

Answer :

(c) 9

$$7 \times 45 = x \times 35 \quad \text{(Product of extremes = Product of means)}$$
$$\Rightarrow 35x = 315$$
$$\Rightarrow x = 9$$

Q13

Answer :

(b) 7

Suppose that x is the number that is to be added.

Then, $(3 + x) : (5 + x) = 5 : 6$

$$\Rightarrow \frac{3 + x}{5 + x} = \frac{5}{6}$$
$$\Rightarrow 18 + 6x = 25 + 5x$$
$$\Rightarrow x = 7$$

Q14

Answer :

(d) 40

Suppose that the numbers are x and y.

Then, $x : y = 3 : 5$ and $(x + 10) : (y + 10) = 5 : 7$

$$\frac{x}{y} = \frac{3}{5}$$
$$x = \frac{3y}{5}$$
$$\Rightarrow \frac{x + 10}{y + 10} = \frac{5}{7} \Rightarrow 7x + 70 = 5y + 50 \Rightarrow 7 \times \frac{3y}{5} + 70 = 5y + 50 \Rightarrow 5y - \frac{21y}{5} =$$

$$20 \Rightarrow \frac{4y}{5} = 20 \Rightarrow y = 25 \text{ Therefore, } x = \frac{3 \times 25}{5} = 15$$

Hence, sum of numbers = 15 + 25 = 40

Q15

Answer :

(a) 3

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 :

$60 - 4x = 57 - 3x$

$\Rightarrow x = 3$

Q16

Answer :

(a) Rs 180

A's share $= \frac{3}{7} \times 420 = 180$

Q17

Answer :

(d) 416

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 $= 256 + 160 = 416$

Q18

Answer :

(a) (2 :3)

LCM of 3 and 7 $= 7 \times 3 = 21$

$\frac{2 \times 7}{3 \times 7} = \frac{14}{21}$ and $\frac{4 \times 3}{7 \times 3} = \frac{12}{21}$

Clearly, $\frac{12}{21} < \frac{14}{21}$

Hence, $\left(4 : 7\right) < \left(2 : 3\right)$

Q19

Answer :

(c) 16

Suppose that the third proportional is x.

Then, $9 : 12 :: 12 : x$

$\Rightarrow 9 \times x = 12 \times 12$ (Product of extremes $=$ Product of means)

$\Rightarrow 9x = 144$

$\Rightarrow x = 16$

Q20

Answer :

(b) 12

Suppose that the mean proportional is x.

Then, 9 : x :: x : 16

$9 \times 16 = x \times x$ (Product of extremes $=$ Product of means)
$\Rightarrow x^2 = 144$
$\Rightarrow x = 12$

Q21

Answer :

(a) 18 years

Suppose that the present ages of A and B are 3x yrs and 8x yrs, respectively.
After six years, the age of A will be (3x+6) yrs and that of B will be (8x+6) yrs.
Then, (3x +6) : (8x + 6) = 4 : 9

$\Rightarrow \frac{3x+6}{8x+6} = \frac{4}{9}$
$\Rightarrow 27x + 54 = 32x + 24$
$\Rightarrow 5x = 30$
$\Rightarrow x = 6$

Hence, the present ages of A and B are 18 yrs and 48 yrs, respectively.