

Exercises – 8 A

Q. 1

Answer :

(i) HCF of 24 and 40 is 8.

$$\therefore 24 : 40 = \frac{24}{40} = \frac{24 \div 8}{40 \div 8} = \frac{3}{5} = 3 : 5$$

Hence, 24 : 40 in its simplest form is 3 : 5.

(ii) HCF of 13.5 and 15 is 1.5.

$$\frac{13.5}{15} = \frac{135}{150}$$

The HCF of 135 and 150 is 15.

$$= \frac{135 \div 15}{150 \div 15} = \frac{9}{10}$$

Hence, 13.5 : 15 in its simplest form is 9 : 10.

(iii) $\frac{20}{3} : \frac{15}{2} = 40 : 45$

The HCF of 40 and 45 is 5.

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

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

(iv) 9 : 6

The HCF of 9 and 6 is 3.

$$\therefore 9 : 6 = \frac{9}{6} = \frac{9 \div 3}{6 \div 3} = 3 : 2$$

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

(v) LCM of the denominators is 2.

$$\therefore 4 : 5 : \frac{9}{2} = 8 : 10 : 9$$

The HCF of these 3 numbers is 1.

$\therefore 8 : 10 : 9$ is the simplest form.

(vi) $2.5 : 6.5 : 8 = 25 : 65 : 80$

The HCF of 25, 65 and 80 is 5.

$$\therefore 25 : 65 : 80 = \frac{25}{65} = \frac{25 \div 5}{65 \div 5} = \frac{5}{13} = 5 : 13 : 16$$

Q. 2

Answer :

(i) Converting both the quantities into the same unit, we have:

$$75 \text{ paise} : (3 \times 100) \text{ paise} = 75 : 300$$

$$= \frac{75}{300} = \frac{75 \div 75}{300 \div 75} = \frac{1}{4} \quad (\because \text{HCF of 75 and 300} = 75)$$

$$= 1 \text{ paise} : 4 \text{ paise}$$

(ii) Converting both the quantities into the same unit, we have:

$$105 \text{ cm} : 63 \text{ cm} = \frac{105}{63} = \frac{105 \div 21}{63 \div 21} = \frac{5}{3} \quad (\because \text{HCF of 105 and 63} = 21)$$

$$= 5 \text{ cm} : 3 \text{ cm}$$

(iii) Converting both the quantities into the same unit

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

$$= 13 \text{ min} : 9 \text{ min}$$

(iv) Converting both the quantities into the same unit, we get:

$$8 \text{ months} : 12 \text{ months} = \frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3} \quad (\because \text{HCF of 8 and 12} = 4)$$

$$= 2 \text{ months} : 3 \text{ months}$$

(v) Converting both the quantities into the same unit, we get:

$$2250 \text{ g} : 3000 \text{ g} = \frac{2250}{3000} = \frac{2250 \div 750}{3000 \div 750} = \frac{3}{4} \quad (\because \text{HCF of 2250 and 3000} = 750)$$

$$= 3 \text{ g} : 4 \text{ g}$$

(vi) Converting both the quantities into the same unit, we get:

$$1000 \text{ m} : 750 \text{ m} = \frac{1000}{750} = \frac{1000 \div 250}{750 \div 250} = \frac{4}{3} \quad (\because \text{HCF of 1000 and 750} = 250)$$

$$= 4 \text{ m} : 3 \text{ m}$$

Q. 3

Answer :

$$\frac{A}{B} = \frac{7}{5} \text{ and } \frac{B}{C} = \frac{9}{14}$$

Therefore, we have:

$$\frac{A}{B} \times \frac{B}{C} = \frac{7}{5} \times \frac{9}{14}$$

$$\frac{A}{C} = \frac{9}{10}$$

$$\therefore A : C = 9 : 10$$

Q. 4

Answer :

$$\frac{A}{B} = \frac{5}{8} \text{ and } \frac{B}{C} = \frac{16}{25}$$

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

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

Q. 5

Answer :

$$A : B = 3 : 5$$

$$B : C = 10 : 13 = \frac{10 \div 2}{13 \div 2} = 5 : \frac{13}{2}$$

$$\text{Now, } A : B : C = 3 : 5 : \frac{13}{2}$$

$$\therefore A : B : C = 6 : 10 : 13$$

Q. 6

Answer :

We have the following:

$$A : B = 5 : 6$$

$$B : C = 4 : 7 = \frac{4 \times \frac{6}{4}}{7 \times \frac{6}{4}} = 6 : \frac{21}{2}$$

$$\therefore A : B : C = 5 : 6 : \frac{21}{2} = 10 : 12 : 21$$

Q. 7

Answer :

$$\text{Sum of the ratio terms} = 7 + 8 = 15$$

Now, we have the following:

$$\text{Kunal's share} = \text{Rs } 360 \times \frac{7}{15} = 24 \times 7 = \text{Rs } 168$$

$$\text{Mohit's share} = \text{Rs } 360 \times \frac{8}{15} = 24 \times 8 = \text{Rs } 192$$

Q. 8

Answer :

$$\text{Sum of the ratio terms} = \frac{1}{5} + \frac{1}{6} = \frac{11}{30}$$

Now, we have the following:

$$\text{Rajan's share} = \text{Rs } 880 \times \frac{\frac{1}{5}}{\frac{11}{30}} = \text{Rs } 880 \times \frac{6}{11} = \text{Rs } 80 \times 6 = \text{Rs } 480$$

$$\text{Kamal's share} = \text{Rs } 880 \times \frac{\frac{1}{6}}{\frac{11}{30}} = \text{Rs } 880 \times \frac{5}{11} = \text{Rs } 80 \times 5 = \text{Rs } 400$$

Q. 9

Answer :

Sum of the ratio terms is $(1 + 3 + 4) = 8$

We have the following:

$$A's \text{ share} = Rs\ 5600 \times \frac{1}{8} = Rs\ \frac{5600}{8} = Rs\ 700$$

$$B's \text{ share} = Rs\ 5600 \times \frac{3}{8} = Rs\ 700 \times 3 = Rs\ 2100$$

$$C's \text{ share} = Rs\ 5600 \times \frac{4}{8} = Rs\ 700 \times 4 = Rs\ 2800$$

Q. 10

Answer :

Let x be the required number.

Then, $(9 + x) : (16 + x) = 2 : 3$

$$\Rightarrow \frac{9+x}{16+x} = \frac{2}{3}$$

$$\Rightarrow 27 + 3x = 32 + 2x \Rightarrow x = 5$$

Hence, 5 must be added to each term of the ratio $9 : 16$ to make it $2 : 3$.

Q. 11

Answer :

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. 12

Answer :

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

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. 13

Answer :

Suppose that the numbers are $5x$ and $9x$.

Then, $(5x - 3) : (9x - 3) = 1 : 2$

$$\Rightarrow \frac{5x-3}{9x-3} = \frac{1}{2}$$

$$\Rightarrow 10x - 6 = 9x - 3$$

$$\Rightarrow x = 3$$

Hence, the numbers are $(5 \times 3 =) 15$ and $(9 \times 3 =) 27$.

Q. 14

Answer :

Let the numbers be $3x$ and $4x$.

Their LCM is $12x$.

Then, $12x = 180$

$$\Rightarrow x = 15$$

$\therefore$ The numbers are $(3 \times 15 =) 45$ and $(4 \times 15 =) 60$.

Q. 15

Answer :

Suppose that the present ages of A and B are $8x$ yrs and $3x$ yrs.

Then, $(8x + 6) : (3x + 6) = 9 : 4$

$$\Rightarrow \frac{8x+6}{3x+6} = \frac{9}{4}$$

$$\Rightarrow 32x + 24 = 27x + 54$$

$$\Rightarrow 5x = 30$$

$$\Rightarrow x = 6$$

Now, present age of A = 8×6 yrs = 48 yrs

Present age of B = 3×6 yrs = 18 yrs

Exercises – 8 B

Q. 1

Answer :

We have:

Product of the extremes = $30 \times 60 = 1800$

Product of the means = $40 \times 45 = 1800$

Product of extremes = Product of means

Hence, $30 : 40 :: 45 : 60$

Q. 2

Answer :

We have:

Product of the extremes = $36 \times 7 = 252$

Product of the means = $49 \times 6 = 294$

Product of the extremes $\neq$ Product of the means

Hence, 36, 49, 6 and 7 are not in proportion.

Q. 3

Answer :

Product of the extremes = $2 \times 27 = 54$

Product of the means = $9 \times x = 9x$

Since $2 : 9 :: x : 27$, we have:

Product of the extremes = Product of the means

$$\Rightarrow 54 = 9x$$

$$\Rightarrow x = 6$$

Q. 4

Answer :

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

Product of the means = $16 \times x = 16x$

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

Product of the extremes = Product of the means

$$\Rightarrow 280 = 16x$$

$$\Rightarrow x = 17.5$$

Q. 5

Answer :

Product of the extremes = $x \times 60 = 60x$

Product of the means = $35 \times 48 = 1680$

Since $x : 35 :: 48 : 60$, we have:

Product of the extremes = Product of the means

$$\Rightarrow 60x = 1680$$

$$\Rightarrow x = 28$$

Q. 6

Answer :

(i) Let the fourth proportional be x .
Then, $8 : 36 :: 6 : x$

$$\begin{aligned} 8 \times x &= 36 \times 6 && [\text{Product of extremes} = \text{Product of means}] \\ \Rightarrow 8x &= 216 \\ \Rightarrow x &= 27 \end{aligned}$$

Hence, the fourth proportional is 27.

(ii) Let the fourth proportional be x .
Then, $5 : 7 :: 30 : x$

$$\begin{aligned} \Rightarrow 5 \times x &= 7 \times 30 && [\text{Product of extremes} = \text{Product of means}] \\ \Rightarrow 8x &= 216 \\ \Rightarrow 5x &= 210 \\ \Rightarrow x &= 42 \end{aligned}$$

Hence, the fourth proportional is 42.

(iii) Let the fourth proportional be x .

$$\begin{aligned} \text{Then, } 2.8 \times x &= 14 \times 3.5 && [\text{Product of extremes} = \text{Product of means}] \\ \Rightarrow 8x &= 216 \\ \Rightarrow 2.8x &= 49 \\ \Rightarrow x &= 17.5 \end{aligned}$$

Hence, the fourth proportional is 17.5.

Q. 7

Answer :

36, 54 and x are in continued proportion.

$$\begin{aligned} \text{Then, } 36 : 54 :: 54 : x &&& [\text{Product of extremes} = \text{Product of means}] \\ \Rightarrow 36 \times x &= 54 \times 54 \\ \Rightarrow 36x &= 2916 \\ \Rightarrow x &= 81 \end{aligned}$$

Q. 8

Answer :

27, 36 and x are in continued proportion.

$$\begin{aligned} \text{Then, } 27 : 36 :: 36 : x &&& [\text{Product of extremes} = \text{Product of means}] \\ \Rightarrow 27 \times x &= 36 \times 36 \\ \Rightarrow 27x &= 1296 \\ \Rightarrow x &= 48 \end{aligned}$$

Hence, the value of x is 48.

Q. 9

Answer :

(i) Suppose that x is the third proportional to 8 and 12.

$$\begin{aligned} \text{Then, } 8 : 12 :: 12 : x &&& (\text{Product of extremes} = \text{Product of means}) \\ \Rightarrow 8 \times x &= 12 \times 12 \\ \Rightarrow 8x &= 144 \\ \Rightarrow x &= 18 \end{aligned}$$

Hence, the required third proportional is 18.

(ii) Suppose that x is the third proportional to 12 and 18.

$$\begin{aligned} \text{Then, } 12 : 18 :: 18 : x &&& (\text{Product of extremes} = \text{Product of means}) \\ \Rightarrow 12 \times x &= 18 \times 18 \\ \Rightarrow 12x &= 324 \\ \Rightarrow x &= 27 \end{aligned}$$

Hence, the third proportional is 27.

(iii) Suppose that x is the third proportional to 4.5 and 6.

$$\begin{aligned} \text{Then, } 4.5 : 6 :: 6 : x &&& (\text{Product of extremes} = \text{Product of means}) \\ \Rightarrow 4.5 \times x &= 6 \times 6 \\ \Rightarrow 4.5x &= 36 \\ \Rightarrow x &= 8 \end{aligned}$$

Hence, the third proportional is 8.

Q. 10

Answer :

The third proportional to 7 and x is 28.

Then, $7 : x :: x : 28$

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

$$\Rightarrow x = 14$$

Exercises – 8 C

Q. 1

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, $a : c = 2 : 3$

Q. 2

Answer :

(a) $15 : 8$

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

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

Hence, $C : A = 15 : 8$

Q. 3

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, $A : C = 15 : 8$

Q. 4

Answer :

The correct option is (b).

$$\frac{15}{100} A = \frac{20}{100} B$$

$$\Rightarrow \frac{A}{B} = \frac{4}{3}$$

Hence, $A : B = 4 : 3$

Q. 5

Answer :

(a) $1 : 3 : 6$

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

$$C = 2B$$

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

Q. 6

Answer :

(b) $30 : 42 : 77$

$$\frac{A}{B} = \frac{5}{7}$$

$$\Rightarrow A = \frac{5B}{7} \quad \frac{B}{C} = \frac{6}{11} \Rightarrow C = \frac{11B}{6}$$

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

Q. 7

Answer :

(c) $6 : 4 : 3$

$$2A = 3B = 4C$$

$$\text{Then, } A = \frac{3B}{2} \text{ and } C = \frac{3B}{4}$$

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

Q. 8

Answer :

(a) $3 : 4 : 5$

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

$$C = \frac{5B}{4}$$

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

$$= 3 : 4 : 5$$

Q. 9

Answer :

(b) $15 : 10 : 6$

$$\frac{1}{x} : \frac{1}{y} = 2 : 3$$

$$\text{Then, } y : x = 2 : 3 \text{ and } y = \frac{2}{3}x$$

$$\frac{1}{y} : \frac{1}{z} = 3 : 5$$

$$\text{Then, } z : y = 3 : 5 \text{ and } z = \frac{3}{5}y$$

$$\therefore x : y : z = x : \frac{2}{3}x : \frac{3}{5}y = x : \frac{2}{3}x : \frac{3}{5} \times \frac{2}{3}x$$

$$= x : \frac{2}{3}x : \frac{2}{5}x = 15 : 10 : 6$$

Q. 10

Answer :

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

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

$$\therefore \frac{7x+3y}{7x-3y} = \frac{7\left(\frac{3y}{4}\right)+3y}{7\left(\frac{3y}{4}\right)-3y}$$

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

$$\text{Hence, } (7x+3y) : (7x-3y) = 11 : 3$$

The correct option is (c).

Q. 11

Answer :

(c) $5 : 2$

$$\frac{3a+5b}{3a-5b} = \frac{5}{1}$$

$$3a + 5b = 15a - 25b$$

$$12a = 30b$$

$$\frac{a}{b} = \frac{30}{12} = \frac{5}{2}$$

$$\therefore a : b = 5 : 2$$

Q. 12

Answer :

(c) 9

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

$$\Rightarrow 35x = 315$$

$$\Rightarrow x = 9$$

Q. 13

Answer :

(b) 7

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

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

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

$$\Rightarrow 18 + 6x = 25 + 5x$$

$$\Rightarrow x = 7$$

Q. 14

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 = $15 + 25 = 40$

Q. 15

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:

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

$$\Rightarrow x = 3$$

