EXERCISE 12(B)

Question 1.
If x, y and z are in continued proportion, then which of the following is true :
(i) x : y = x : z
(ii) x : x = z : y
(iii) x : y = y : z
(iv) y : x = y : z
Solution:
(iii) x : y = y : z

Question 2.
Which of the following numbers are in continued proportion :
(i) 3, 6 and 15
(ii) 15, 45 and 48
(iii) 6, 12 and 24
(iv) 12, 18 and 27
Solution:
(iii) and (iv)

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Question 3.
Find the mean proportion between
(i) 3 and 27
(ii) 0.06 and 0.96
Solution:

(*i*) Mean proportional between 3 and 27

$$= \sqrt{3 \times 27} = \sqrt{81} = 9$$

(*ii*) Mean proportional between 0·6 and 9·6

$$= \sqrt{0{\cdot}6 \times 9{\cdot}6} = \sqrt{\frac{6}{10} \times \frac{96}{10}}$$

$$= \sqrt{\frac{576}{100}} = \frac{24}{10} = 2{\cdot}4$$

Question 4.
Find the third proportional to :
(i) 36, 18
(ii) 5.25, 7
(iii) ₹ 1.60, ₹ 0.40
Solution:

(i) Let the required third proportional be x

$\therefore$ 36, 18, x are in continued proportion

$\Rightarrow 36 : 18 = 18 : x$

$\Rightarrow 36x = 18 \times 18$

$\Rightarrow x = \frac{18 \times 18}{36}$

$\Rightarrow x = 9$

$\therefore$ Required proportional = 9

(ii) Let the required third proportional be x

$\therefore$ 5.25, 7, x are in continued proportion

$\Rightarrow 5.25 : 7 = 7 : x$

$\Rightarrow 5x = 7 \times 7$

$\Rightarrow x = \frac{7 \times 7}{5.25}$

$\Rightarrow x = \frac{49}{5.25} = \frac{28}{3}$

$\Rightarrow x = 9\frac{1}{3}$

(iii) Let the required third proportional be x

$\therefore$ ₹1.60, ₹0.40, ₹x are in continued proportion.

$\Rightarrow 1.60 \times x = 0.40 \times 0.40$

$\Rightarrow x = \frac{0.40 \times 0.40}{1.60}$

=> x = 0.1

Question 5.

The ratio between 7 and 5 is same as the ratio between ₹ x and ₹ 20.50 ; find the value of x.

Solution:

Since, It is given that the ratio between 7 and 5 is same as the ratio between ₹ x and ₹

20.50

$\therefore \quad 7 : 5 = x = 20.50$

$\Rightarrow \quad 5x = 7 \times 20.50$

$$\Rightarrow \quad x = \frac{7 \times 20.50}{5}$$

$\Rightarrow \quad x = 82.7$

Question 6.

If (4x + 3y) : (3x + 5y) = 6 : 7, find :

(i) x : y

(ii) x, if y = 10

(iii) y, if x = 27

Solution:

(i) $7x\,(4x + 3y) = 6x\,(3x + 5y)$

$28x + 21y = 18x + 30y$

$28x - 18x = 30y - 21y$

$10x = 9y$

$$\frac{x}{y} = \frac{9}{10}$$

$\therefore \quad x : y = 9 : 10$

(ii) $(4x + 3y) : (3x + 5y) = 6 : 7$

Given, $y = 10$

$\therefore \quad (4x + 3 \times 10) : (3x + 5 \times 10) = 6 : 7$

$(4x + 30) : (3x + 50) = 6 : 7$

$7 \times (4x + 30) = 6 \times (3x + 50)$

$28x + 210 = 18x + 300$

$28x - 18x = 300 - 210$

$10x = 90$

$$\Rightarrow \quad x = \frac{90}{10} = 9$$

(iii) $(4x + 3y) : (3x + 5y) = 6 : 7$

Given, $x = 27$

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$\therefore$ $(4 \times 27 + 3y) : (3 \times 27 + 5y) = 6 : 7$

$(108 + 3y) : (81 + 5y) = 6 : 7$

$7 \times (108 + 3y) = 6 \times (81 + 5y)$

$756 + 21y = 486 + 30y$

$9y = 270$

$\Rightarrow y = \frac{270}{9} = 30$

Question 7.

If $\frac{2y+5x}{3y-5x} = 2\frac{1}{2}$, find:

(i) x : y

(ii) x, if y = 70

(iii) y, if x = 33

Solution:

(i) $\frac{2y+5x}{3y-5x} = \frac{2\times2+1}{2}$

$\frac{2y+5x}{3y-5x} = \frac{5}{2}$

$\Rightarrow 2(2y + 5x) = 5 \times (3y - 5x)$

$\Rightarrow 4y + 10x = 15y - 25x$

$\Rightarrow 35x = 11y$

$\Rightarrow \frac{x}{y} = \frac{11}{35}$ *i.e.* $x : y = 11 : 35$

(ii) $\frac{2y+5x}{3y-5x} = \frac{5}{2}$

Given $y = 70$

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$$\frac{2\times 70+5x}{3\times 70-5x}=\frac{5}{2} \Rightarrow \frac{140+5x}{210-5x}=\frac{5}{2}$$

$\Rightarrow 2 \times (140 + 5x) = 5 \times (210 - 5x)$

$\Rightarrow 280 + 10x = 1050 - 25x$

$\Rightarrow 35x = 1050 - 280$

$\Rightarrow 35x = 770 \qquad \Rightarrow x = \frac{770}{35} = 22$

(iii) $\frac{2y+5x}{3y-5x} = \frac{5}{2}$

Given $x = 33$

$$\frac{2y+5\times 33}{3y-5\times 33} = \frac{5}{2} \Rightarrow \frac{2y+165}{3y-165}=\frac{5}{2}$$

$\Rightarrow 2 \times (2y + 165) = 5 \times (3y - 165)$

$\Rightarrow 4y + 330 = 15y - 825$

$\Rightarrow 11y = 1155$

$\Rightarrow y = \frac{1155}{11} = 105$

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