

MATHS CLASS X Continuation....

CHAPTER 5 (QUADRATIC EQUATIONS IN ONE VARIABLE)

General direction for the students :-Whatever be the questions solved , everything must be copied in the Maths Copy and then do the Home work in the same Copy.

Q22. Let the number of rows = x

$$\Rightarrow \text{number of column} = x + 4$$

A/Q $x(x + 4) = 480$

$$\Rightarrow x^2 - 4x - 480 = 0$$

$$\Rightarrow (x - 24)(x + 20) = 0$$

$$\Rightarrow x = 24, -20$$

\Rightarrow Number of students in each row=24

Q27. Let the original speed = x km/h

$$\text{New speed} = (x + 12) \text{ km/h}$$

$$\text{Distance} = 400 \text{ km}$$

$$\text{Original time taken} = \frac{400}{x} \text{ ----- (1)}$$

$$\text{New time} = \frac{400}{x+12} \text{ ----- (2)}$$

A/Q $\frac{400}{x} = \frac{400}{x+12} + \frac{100}{60}$

$$\Rightarrow 400 \left[\frac{x+12-x}{x(x+12)} \right] = \frac{5}{3}$$

$$\Rightarrow 2880 = x^2 + 12x$$

$$\Rightarrow x^2 + 12x - 2880 = 0$$

$$\Rightarrow (x + 60)(x - 48) = 0$$

$$\Rightarrow x = 48, -60$$

\Rightarrow original speed = 48 km/h, - 60 is not possible.

Q32. Let the speed of the boat in still water = x km/h

1st case:- Upstream

$$\text{Relative speed of the boat} = (x - 1.5) \text{ km/h}$$

Distance=10 km

$$\text{Time} = \frac{10}{x - 1.5}$$

2nd case:- Downstream

Relative speed of the boat $= (x + 1.5) \text{ km/h}$

Distance=5 km

$$\text{Time} = \frac{5}{x + 1.5}$$

$$\text{A/Q total time} = \frac{10}{x - 1.5} + \frac{5}{x + 1.5} = 6$$

$$\Rightarrow 5 \left[\frac{2(x+1.5)+x-1.5}{(x-1.5)(x+1.5)} \right] = 6$$

$$\Rightarrow 15x + 7.5 = 6(x^2 - 2.25)$$

$$\Rightarrow 6x^2 - 15x - 21 = 0$$

$$\Rightarrow 2x^2 - 5x - 7 = 0$$

$$\Rightarrow 2x^2 - 7x + 2x - 7 = 0$$

$$\Rightarrow x(2x - 7) + (2x - 7) = 0$$

$$\Rightarrow (2x - 7)(x + 1) = 0$$

$$\Rightarrow x = 3.5, -1$$

\Rightarrow Required speed = 3.5 km/h

Q38. Let the original length of the cloth = x m

Total cost = Rs 300

$$\Rightarrow \text{cost for 1 metre} = \frac{300}{x}$$

New length = $(x + 5)$ m

$$\Rightarrow \text{cost for 1 metre} = \frac{300}{x+5}$$

$$\text{A/Q } \frac{300}{x} = \frac{300}{x+5} + 2$$

$$\Rightarrow 300 \left[\frac{x+5-x}{x(x+5)} \right] = 2$$

$$\Rightarrow 750 = x^2 + 5x$$

$$\Rightarrow x^2 + 5x - 750 = 0$$

$$\Rightarrow (x + 30)(x - 25) = 0$$

$$\Rightarrow x = 25, -30$$

Original length of the cloth = 25 metre.

Cost per metre = Rs 12.

Q41. CP of saree = $60x$ -----(1)

$$\text{SP of saree} = 500 + 4x$$

$$\text{Loss} = x\%$$

$$\text{We know } SP = CP \left(1 - \frac{L}{100}\right)$$

$$\Rightarrow 500 + 4x = 60x \left(1 - \frac{x}{100}\right)$$

$$\Rightarrow 5000 + 40x = 600x - 6x^2$$

$$\Rightarrow 6x^2 - 560x + 5000 = 0$$

$$\Rightarrow 3x^2 - 280x + 2500 = 0$$

$$\Rightarrow 3x^2 - 250x - 30x + 2500 = 0$$

$$\Rightarrow x(3x - 250) - 10(3x - 250) = 0$$

$$\Rightarrow (3x - 250)(x - 10) = 0$$

$$\Rightarrow x = \frac{250}{3}, 10$$

\therefore The CP of the saree = Rs 600 or Rs 5000 (sub. The value of x in (1))

HOME WORK : Left over questions from the exercise 5.5, from 21 to last.

Chapter 5 is completed.