Quadratic Equations Ex 8.13 Q1

Answer :

Let the length of the piece be x metres.

Then, rate per metre $= \frac{35}{x}$

According to question, new length $= (x+4)$ meters.

Since the cost remain same. Therefore, new rate per metre $= \frac{35}{x+4}$

It is given that

$$\frac{35}{x} - \frac{35}{x+4} = 1$$

$$\frac{35(x+4)-35x}{x(x+4)} = 1$$

$$\frac{\cancel{35x} + 140 \cancel{-35x}}{x(x+4)} = 1$$

$$\frac{140}{x(x+4)} = 1$$

$$x^2 + 4x = 140$$

$$x^2 + 4x - 140 = 0$$

$$x^2 + 14x - 10x - 140 = 0$$

$$x(x+14) - 10(x+14) = 0$$

$$(x+14)(x-10) = 0$$

$$(x+14) = 0 \quad \text{or} \quad (x-10) = 0$$

$$x = -14 \qquad x = 10$$

Because x cannot be negative.

Thus, $x = 10$ is the require solution.

Therefore, the length of the piece be $\boxed{x = 10 \text{ metres}}$

Quadratic Equations Ex 8.13 Q2

Answer :

Let x students planned a picnic.

Then, the share of each student $= \frac{480}{x}$

According to question, 8 students fail to go picnic, then remaining students $= (x-8)$.

Therefore, new share of each student $= \frac{480}{x-8}$

It is given that

$$\frac{480}{x-8} - \frac{480}{x} = 10$$

$$\frac{480x - 480(x-8)}{(x-8)x} = 10$$

$$\frac{\cancel{480x} + 3840 \cancel{- 480x}}{(x-8)x} = 10$$

$$\frac{3840}{(x-8)x} = 10$$

$$10(x^2 - 8x) = 3840$$

$$(x^2 - 8x) = 384$$

$$x^2 - 8x - 384 = 0$$

$$x^2 + 16x - 24x - 384 = 0$$

$$x(x+16) - 24(x+16) = 0$$

$$(x+16)(x-24) = 0$$

$$(x+16) = 0 \quad \text{or} \quad (x-24) = 0$$

$$x = -16 \qquad x = 24$$

Because x cannot be negative.

Thus, the total numbers of students attend a picnic

$$= x - 8$$

$$= 24 - 8$$

$$= 16$$

Therefore, the total numbers of students attend a picnic be $\boxed{x = 16}$

Quadratic Equations Ex 8.13 Q3

Answer :

Let the cost price of article be Rs. x.

Then, gain percent = x

Therefore, the selling price of article

$$=\left(x+\frac{x}{100}\times x\right)$$

$$=\frac{x^2+100x}{100}$$

It is given that

$$\frac{x^2+100x}{100}=24$$

$$x^2+100x=2400$$

$$x^2+100x-2400=0$$

$$x^2+120x-20x-2400=0$$

$$x(x+120)-20(x+120)=0$$

$$(x+120)(x-20)=0$$

$$(x+120)=0 \quad \text{or} \quad (x-20)=0$$

$$x=-120 \qquad x=20$$

Because x cannot be negative.

Thus, $x=20$ is the require solution.

Therefore, the cost price of article be $\boxed{x=\text{Rs. } 20}$

********** END **********