Quadratic Equations Ex 8.8 Q10

Answer :

Let the original speed of train be x km/hr. Then,

Increased speed of the train $=(x+5)$ km/hr

Time taken by the train under usual speed to cover $360\,\text{km} = \frac{360}{x}\,\text{hr}$

Time taken by the train under increased speed to cover $360\,\text{km} = \frac{360}{(x+5)}\,\text{hr}$

Therefore,

$$\frac{360}{x} - \frac{360}{(x+5)} = 1$$

$$\frac{\{360(x+5) - 360x\}}{x(x+5)} = 1$$

$$\frac{360x + 1800 - 360x}{x^2 + 5x} = 1$$

$$\frac{\cancel{360x} + 1800 - \cancel{360x}}{x^2 + 5x} = 1$$

$$1800 = x^2 + 5x$$

$$x^2 + 5x - 1800 = 0$$

$$x^2 + 5x - 1800 = 0$$

$$x^2 - 40x + 45x - 1800 = 0$$

$$x(x-40) + 45(x-40) = 0$$

$$(x-40)(x+45) = 0$$

So, either

$$(x-40) = 0$$

$$x = 40$$

Or

$$(x+45) = 0$$

$$x = -45$$

But, the speed of the train can never be negative.

Hence, the original speed of train is $\boxed{x = 40\,\text{km/hr}}$

Quadratic Equations Ex 8.8 Q11

Answer :

Let the speed of the passenger train be $x\,\text{km/hr}$. Then,

Speed of the express train $=(x+11)\,\text{km/hr}$

Time taken by the passenger train to cover $132\,\text{km}$ between Mysore to Bangalore $=\frac{132}{x}\,\text{hr}$

Time taken by the express train to cover $132\,\text{km}$ between Mysore to Bangalore $=\frac{132}{(x+11)}\,\text{hr}$

Therefore,

$$\frac{132}{x}-\frac{132}{(x+11)}=1$$

$$\frac{\{132(x+11)-132x\}}{x(x+11)}=1$$

$$\frac{132x+1452-132x}{x^2+11x}=1$$

$$\frac{\cancel{132x}+1452-\cancel{132x}}{x^2+11x}=1$$

$$1452=x^2+11x$$

$$x^2+11x-1452=0$$

$$x^2+11x-1452=0$$

$$x^2-33x+44x-1452=0$$

$$x(x-33)+44(x-33)=0$$

$$(x-33)(x+44)=0$$

So, either

$$(x-33)=0$$

$$x=33$$

Or

$$(x+44)=0$$

$$x=-44$$

But, the speed of the train can never be negative.

Thus, when $x=33$ then speed of express train

$$=(x+11)$$

$$=(33+11)$$

$$=44$$

Hence, the speed of the passenger train is $\boxed{x=33\,\text{km/hr}}$

and the speed of the express train is $\boxed{x=44\,\text{km/hr}}$ respectively.

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