Quadratic Equations Ex 8.12 Q3

Answer :

Let the first water tape takes x hours to fill the tank. Then the second water tape will takes $=(x+10)$ hours to fill the tank.

Since, the faster water tape takes x hours to fill the tank.

Therefore, portion of the tank filled by the faster water tape in one hour $=\frac{1}{x}$

So, portion of the tank filled by the faster water tape in $9\frac{3}{8}$ hours $=\frac{75}{8x}$

Similarly,

Portion of the tank filled by the slower water tape in $9\frac{3}{8}$ hours $=\frac{75}{8(x+10)}$

It is given that the tank is filled in $9\frac{3}{8}$ hours.

So,

$$\frac{75}{8x}+\frac{75}{8(x+10)}=1$$

$$\frac{75(x+10)+75x}{8x(x+10)}=1$$

$$75x+750+75x=8x^2+80x$$

$$8x^2+80x-150x-750=0$$

$$8x^2-70x-750=0$$

$$4x^2-35x-375=0$$

$$4x^2-60x+25x-375=0$$

$$4x(x-15)+25(x-15)=0$$

$$(x-15)(4x+25)=0$$

$$(x-15)=0 \quad \text{or} \quad (4x+25)=0$$

$$x=15 \quad \text{or} \quad x=\frac{-25}{4}$$

But, x cannot be negative.

Therefore, when $x=15$ then

$$(x+10)=15+10$$

$$=25$$

Hence, the first water tape will takes $\boxed{15\,\text{hours}}$ to fill the tank, and the second water tape will takes $\boxed{25\,\text{hours}}$ to fill the tank.

Quadratic Equations Ex 8.12 Q4

Answer :

Let the first pipe takes x minutes to fill the tank. Then the second pipe will takes $=(x+5)$ minutes to fill the tank.

Since, the first pipe takes x minutes to fill the tank.

Therefore, portion of the tank filled by the first pipe in one minutes $=\frac{1}{x}$

So, portion of the tank filled by the first pipe in $11\frac{1}{9}$ minutes $=\frac{100}{9x}$

Similarly,

Portion of the tank filled by the second pipe in $11\frac{1}{9}$ minutes $=\frac{100}{9(x+5)}$

It is given that the tank is filled in $11\frac{1}{9}$ minutes.

So,

$$\frac{100}{9x}+\frac{100}{9(x+5)}=1$$

$$\frac{100(x+5)+100x}{9x(x+5)}=1$$

$$100x+500+100x=9x^2+45x$$

$$9x^2+45x-200x-500=0$$

$$9x^2-155x-500=0$$

$$9x^2-180x+25x-500=0$$

$$9x(x-20)+25(x-20)=0$$

$$(x-20)(9x+25)=0$$

$$(x-20)=0 \quad \text{or} \quad (9x+25)=0$$

$$x=20 \qquad\qquad x=\frac{-25}{9}$$

But, x cannot be negative.

Therefore, when $x = 20$ then

$$(x+5)=20+5=25$$

Hence, the first water tape will takes 20 min to fill the tank, and the second water tape will take 25 min to fill the tank.

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