Quadratic Equations Ex 8.3 Q45

Answer:

We have been given

$$\frac{1}{x-1} - \frac{1}{x+5} = \frac{6}{7}$$

$$\frac{6}{x^2+4x-5} = \frac{6}{7}$$

$$x^2 + 4x - 12 = 0$$

Now we solve the above quadratic equation using factorization method.

Therefore,

$$x^2 + 6x - 2x - 12 = 0$$

$$x(x+6) - 2(x+6) = 0$$

$$(x-2)(x+6) = 0$$

Now, one of the products must be equal to zero for the whole product to be zero. Hence we equate both the products to zero in order to find the value of x.

Therefore,

$$x - 2 = 0$$

$$x = 2$$

Or

$$x + 6 = 0$$

$$x = -6$$

Hence

$$\boxed{x = 2} \ \boxed{x = -6} \ .$$

Quadratic Equations Ex 8.3 Q46

Answer:

We have been given

$$\frac{1}{x} - \frac{1}{x-2} = 3$$

$$-2 = 3x^2 - 6x$$

$$3x^2 - 6x + 2 = 0$$

Now we solve the above quadratic equation using factorization method.

Therefore,

$$3x^2 - (3+\sqrt{3})x - (3-\sqrt{3})x + 3 - \sqrt{3} + \sqrt{3} - 1 = 0$$

$$x(3x-3-\sqrt{3}) + \left(\frac{-3+\sqrt{3}}{3}\right)(3x-3-\sqrt{3}) = 0$$

$$\left(\frac{3x-3+\sqrt{3}}{3}\right)(3x-3-\sqrt{3}) = 0$$

$$(\sqrt{3}x - \sqrt{3} + 1)(\sqrt{3}x - \sqrt{3} - 1) = 0$$

Now, one of the products must be equal to zero for the whole product to be zero. Hence we equate both the products to zero in order to find the value of x.

Therefore,

$$\sqrt{3}x - \sqrt{3} + 1 = 0$$
$$\sqrt{3}x = \sqrt{3} - 1$$
$$x = \frac{\sqrt{3} - 1}{\sqrt{3}}$$

Or

$$\sqrt{3}x - \sqrt{3} - 1 = 0$$
$$\sqrt{3}x = \sqrt{3} + 1$$
$$x = \frac{\sqrt{3} + 1}{\sqrt{3}}$$

Hence, $\boxed{x = \dfrac{\sqrt{3} - 1}{\sqrt{3}}}$ or $\boxed{x = \dfrac{\sqrt{3} + 1}{\sqrt{3}}}$.

Quadratic Equations Ex 8.3 Q47

Answer:

We have been given

$$x - \frac{1}{x} = 3$$
$$x^2 - 1 = 3x$$
$$x^2 - 3x - 1 = 0$$

Now we solve the above quadratic equation using factorization method.

Therefore,

$$x^2 - \left(\frac{3 - \sqrt{13}}{2}\right)x - \left(\frac{3 + \sqrt{13}}{2}\right)x + \left(\frac{3 + \sqrt{13}}{2}\right)\left(\frac{3 - \sqrt{13}}{2}\right) = 0$$

$$x\left(x - \left(\frac{3 - \sqrt{13}}{2}\right)\right) - \left(\frac{3 + \sqrt{13}}{2}\right)\left(x - \left(\frac{3 - \sqrt{13}}{2}\right)\right) = 0$$

$$\left[x - \left(\frac{3 - \sqrt{13}}{2}\right)\right]\left[x - \left(\frac{3 + \sqrt{13}}{2}\right)\right] = 0$$

Now, one of the products must be equal to zero for the whole product to be zero. Hence we equate both the products to zero in order to find the value of x.

Therefore,

$$x - \left(\frac{3 - \sqrt{13}}{2} \right) = 0$$

$$x = \frac{3 - \sqrt{13}}{2}$$

Or

$$x - \left(\frac{3 + \sqrt{13}}{2} \right) = 0$$

$$x = \frac{3 + \sqrt{13}}{2}$$

Hence, $\boxed{x = \dfrac{3 - \sqrt{13}}{2}}$ or $\boxed{x = \dfrac{3 + \sqrt{13}}{2}}$.

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