



Quadratic Equations Ex 8.4 Q1

Answer :

We have been given that,

$$x^2 - 4\sqrt{2}x + 6 = 0$$

Now we take the constant term to the right hand side and we get

$$x^2 - 4\sqrt{2}x = -6$$

Now add square of half of co-efficient of 'x' on both the sides. We have,

$$x^2 - 4\sqrt{2}x + (2\sqrt{2})^2 = (2\sqrt{2})^2 - 6$$

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

$$(x - 2\sqrt{2})^2 = 2$$

Since right hand side is a positive number, the roots of the equation exist.

So, now take the square root on both the sides and we get

$$x - 2\sqrt{2} = \pm\sqrt{2}$$

$$x = 2\sqrt{2} \pm \sqrt{2}$$

Now, we have the values of 'x' as

$$x = 2\sqrt{2} + \sqrt{2}$$

$$= 3\sqrt{2}$$

Also we have,

$$x = 2\sqrt{2} - \sqrt{2}$$

$$= \sqrt{2}$$

Therefore the roots of the equation are $\boxed{3\sqrt{2}}$ and $\boxed{\sqrt{2}}$.

Quadratic Equations Ex 8.4 Q2

Answer :

We have to find the roots of given quadratic equation by the method of completing the square. We have,

$$2x^2 - 7x + 3 = 0$$

We should make the coefficient of x^2 unity. So,

$$x^2 - \frac{7}{2}x + \frac{3}{2} = 0$$

Now shift the constant to the right hand side,

$$x^2 - \frac{7}{2}x = -\frac{3}{2}$$

Now add square of half of coefficient of x on both the sides,

$$x^2 - 2\left(\frac{7}{4}\right)x + \left(\frac{7}{4}\right)^2 = -\frac{3}{2} + \left(\frac{7}{4}\right)^2$$

We can now write it in the form of perfect square as,

$$\begin{aligned}\left(x - \frac{7}{4}\right)^2 &= -\frac{3}{2} + \frac{49}{16} \\ &= \frac{25}{16}\end{aligned}$$

Taking square root on both sides,

$$\left(x - \frac{7}{4}\right) = \sqrt{\frac{25}{16}}$$

So the required solution of x ,

$$\begin{aligned} x &= \frac{7}{4} \pm \frac{5}{4} \\ &= \boxed{3, \frac{1}{2}} \end{aligned}$$

Quadratic Equations Ex 8.4 Q3

Answer :

We have been given that,

$$3x^2 + 11x + 10 = 0$$

Now divide throughout by 3. We get,

$$x^2 + \frac{11}{3}x + \frac{10}{3} = 0$$

Now take the constant term to the RHS and we get

$$x^2 + \frac{11}{3}x = -\frac{10}{3}$$

Now add square of half of co-efficient of 'x' on both the sides. We have,

$$\begin{aligned} x^2 + \frac{11}{3}x + \left(\frac{11}{6}\right)^2 &= \left(\frac{11}{6}\right)^2 - \frac{10}{3} \\ x^2 + \left(\frac{11}{6}\right)^2 + 2\left(\frac{11}{6}\right)x &= \frac{1}{36} \\ \left(x + \frac{11}{6}\right)^2 &= \frac{1}{36} \end{aligned}$$

Since RHS is a positive number, therefore the roots of the equation exist.

So, now take the square root on both the sides and we get

$$\begin{aligned} x + \frac{11}{6} &= \pm \frac{1}{6} \\ x &= -\frac{11}{6} \pm \frac{1}{6} \end{aligned}$$

Now, we have the values of 'x' as

$$\begin{aligned}x &= -\frac{11}{6} + \frac{1}{6} \\&= -\frac{5}{3}\end{aligned}$$

Also we have,

$$\begin{aligned}x &= -\frac{11}{6} - \frac{1}{6} \\&= -2\end{aligned}$$

Therefore the roots of the equation are $\boxed{-2}$ and $\boxed{-\frac{5}{3}}$.

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