Quadratic Equations Ex 8.4 Q7

Answer :

We have been given that,

$$\sqrt{2}x^2 - 3x - 2\sqrt{2} = 0$$

Now divide throughout by $\sqrt{2}$. We get,

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

Now take the constant term to the RHS and we get

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

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

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

$$x^2 + \left(\frac{3}{2\sqrt{2}}\right)^2 - 2\left(\frac{3}{2\sqrt{2}}\right)x = \frac{25}{8}$$

$$\left(x - \frac{3}{2\sqrt{2}}\right)^2 = \frac{25}{8}$$

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

$$x - \frac{3}{2\sqrt{2}} = \pm\frac{5}{2\sqrt{2}}$$

$$x = \frac{3}{2\sqrt{2}} \pm \frac{5}{2\sqrt{2}}$$

Now, we have the values of 'x' as

$$x = \frac{3}{2\sqrt{2}} + \frac{5}{2\sqrt{2}}$$
$$= 2\sqrt{2}$$

Also we have,

$$x = \frac{3}{2\sqrt{2}} - \frac{5}{2\sqrt{2}}$$
$$= -\frac{1}{\sqrt{2}}$$

Therefore the roots of the equation are $\boxed{2\sqrt{2}}$ and $\boxed{-\frac{1}{\sqrt{2}}}$.

Quadratic Equations Ex 8.4 Q8

Answer :

We have been given that,

$$\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$$

Now divide throughout by $\sqrt{3}$. We get,

$$x^2 + \frac{10}{\sqrt{3}}x + 7 = 0$$

Now take the constant term to the RHS and we get

$$x^2 + \frac{10}{\sqrt{3}}x = -7$$

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

$$x^2 + \frac{10}{\sqrt{3}}x + \left(\frac{10}{2\sqrt{3}}\right)^2 = \left(\frac{10}{2\sqrt{3}}\right)^2 - 7$$

$$x^2 + \left(\frac{10}{2\sqrt{3}}\right)^2 + 2\left(\frac{10}{2\sqrt{3}}\right)x = \frac{16}{12}$$

$$\left(x + \frac{10}{2\sqrt{3}}\right)^2 = \frac{16}{12}$$

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

$$x + \frac{10}{2\sqrt{3}} = \pm\frac{4}{2\sqrt{3}}$$

$$x = -\frac{10}{2\sqrt{3}} \pm \frac{4}{2\sqrt{3}}$$

Now, we have the values of 'x' as

$$x = -\frac{10}{2\sqrt{3}} + \frac{4}{2\sqrt{3}}$$

$$= -\sqrt{3}$$

Also we have,

$$x = -\frac{10}{2\sqrt{3}} - \frac{4}{2\sqrt{3}}$$

$$= -\frac{7}{\sqrt{3}}$$

Therefore the roots of the equation are $\boxed{-\sqrt{3}}$ and $\boxed{-\frac{7}{\sqrt{3}}}$.

Quadratic Equations Ex 8.4 Q9

Answer :

We have been given that,

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

Now take the constant term to the RHS and we get

$$x^2-\left(\sqrt{2}+1\right)x=-\sqrt{2}$$

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

$$x^2-\left(\sqrt{2}+1\right)x+\left(\frac{\sqrt{2}+1}{2}\right)^2=\left(\frac{\sqrt{2}+1}{2}\right)^2-\sqrt{2}$$

$$x^2+\left(\frac{\sqrt{2}+1}{2}\right)^2-2\left(\frac{\sqrt{2}+1}{2}\right)x=\frac{3-2\sqrt{2}}{4}$$

$$\left(x-\frac{\sqrt{2}+1}{2}\right)^2=\frac{\left(\sqrt{2}-1\right)^2}{2^2}$$

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

$$x-\frac{\sqrt{2}+1}{2}=\pm\left(\frac{\sqrt{2}-1}{2}\right)$$

$$x=\frac{\sqrt{2}+1}{2}\pm\frac{\sqrt{2}-1}{2}$$

Now, we have the values of '*x*' as

$$x=\frac{\sqrt{2}+1}{2}+\frac{\sqrt{2}-1}{2}$$
$$=\sqrt{2}$$

Also we have,

$$x=\frac{\sqrt{2}+1}{2}-\frac{\sqrt{2}-1}{2}$$
$$=1$$

Therefore the roots of the equation are $\boxed{\sqrt{2}}$ and $\boxed{1}$.

Quadratic Equations Ex 8.4 Q10

Answer :

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

$$x^2-4ax+4a^2-b^2=0$$

Now shift the constant to the right hand side,

$$x^2-4ax=b^2-4a^2$$

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

$$x^2-2(2a)x+(2a)^2=b^2-4a^2+(2a)^2$$

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

$$(x-2a)^2=b^2$$

Taking square root on both sides,

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

So the required solution of x ,

$$x=2a\pm b$$
$$=\boxed{2a+b,2a-b}$$

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