Quadratic Equations Ex 8.1 Q2

Answer :

We are given the following quadratic equations and we are asked to find whether the given values are solutions or not

(i)

We have been given that,

$x^2-3x+2=0,\ x=2,x=-1$

Now if $x=2$ is a solution of the equation then it should satisfy the equation

So, substituting $x=2$ in the equation we get

$$\begin{aligned}x^2-3x+2&=(2)^2-3(2)+2\\&=4-6+2\\&=0\end{aligned}$$

Hence, $x=2$ is a solution of the quadratic equation given.

Also, if $x=-1$ is a solution of the equation then it should satisfy the equation

So, substituting $x=-1$ in the equation, we get

$$\begin{aligned}x^2-3x+2&=(-1)^2-3(-1)+2\\&=1+3+2\\&=6\end{aligned}$$

Hence $x=-1$ is not a solution of the quadratic equation

Therefore, from the above results we find out that $x=2$ is a solution and $x=-1$ is not a solution of the quadratic equation.

(ii) We have been given that,

$x^2+x+1=0,x=0,x=1$

Now if $x=0$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=0$ in the equation, we get

$$\begin{aligned}x^2+x+1&=(0)^2+(0)+1\\&=1\end{aligned}$$

Hence $x=0$ is not a solution of the quadratic equation given

Also, if $x=1$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=1$ in the equation, we get

$$\begin{aligned}x^2+x+1&=(1)^2+(1)+1\\&=3\end{aligned}$$

Hence $x=1$ is not a solution of the quadratic equation.

Therefore, from the above results we find out that both $x=0$ and $x=-1$ are not a solution of the quadratic equation given.

(iii) We have been given that,

$x^2-3\sqrt{3}x+6=0,x=\sqrt{3},x=-2\sqrt{3}$

Now if $x=\sqrt{3}$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=\sqrt{3}$ in the equation, we get

$$\begin{aligned}x^2-3\sqrt{3}x+6&=\left(\sqrt{3}\right)^2-3\sqrt{3}\left(\sqrt{3}\right)+6\\&=3-9+6\\&=0\end{aligned}$$

Hence $x=\sqrt{3}$ is a solution of the quadratic equation.

Also, if $x=-2\sqrt{3}$ is a solution of the equation then it should satisfy the equation

So, substituting $x=-2\sqrt{3}$ in the equation, we get

$$\begin{aligned}x^2-3\sqrt{3}+6&=\left(2\sqrt{3}\right)^2-3\sqrt{3}\left(2\sqrt{3}\right)+6\\&=12-18+6\\&=0\end{aligned}$$

Hence $x=-2\sqrt{3}$ is a solution of the quadratic equation.

Therefore, from the above results we find out that $x=\sqrt{3}$ is a solution and $x=-2\sqrt{3}$ is a solution of the quadratic equation given.

(iv) We have been given that,

$$x+\frac{1}{x}=\frac{13}{6}$$

$$x+\frac{1}{x}-\frac{13}{6}=0, x=\frac{5}{6}, x=\frac{4}{3}$$

Now if $x=\frac{5}{6}$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=\frac{5}{6}$ in the equation, we get

$$\begin{aligned}x+\frac{1}{x}-\frac{13}{6}&=\left(\frac{5}{6}\right)+\frac{6}{5}-\frac{13}{6}\\&=\frac{25+36-65}{30}\\&=\frac{-4}{30}\end{aligned}$$

Hence $x=\frac{5}{6}$ is not a solution of the quadratic equation.

Also, if $x=\frac{4}{3}$ is a solution of the equation then it should satisfy the equation

So, substituting $x=\frac{4}{3}$ in the equation, we get

$$\begin{aligned}x+\frac{1}{x}-\frac{13}{6}&=\frac{4}{3}+\frac{3}{4}-\frac{13}{6}\\&=\frac{16+9-26}{12}\\&=\frac{-1}{12}\end{aligned}$$

Hence $x=\frac{4}{3}$ is not a solution of the quadratic equation.

Therefore, from the above results we find out that both $x=\frac{5}{6}$ and $x=\frac{4}{3}$ are not solutions of the quadratic equation given.

(v) We have been given that,

$$2x^2-x+9=x^2+4x+3$$

$$x^2-5x+6=0, x=2, x=3$$

Now if $x=2$ is a solution of the equation then it should satisfy the equation

So, substituting $x=2$ in the equation, we get

$$\begin{aligned}x^2-5x+6&=(2)^2-5(2)+6\\&=10-10\\&=0\end{aligned}$$

Hence $x=2$ is a solution of the quadratic equation given.

Also, if $x=3$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=3$ in the equation, we get

$$\begin{aligned}x^2-5x+6&=(3)^2-5(3)+6\\&=15-15\\&=0\end{aligned}$$

Hence $x=3$ is a solution of the quadratic equation.

Therefore, from the above results we find out that both $x=2$ and $x=3$ are solutions of the quadratic equation given.

(vi) We have been given that,

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

Now if $x=-\sqrt{2}$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=-\sqrt{2}$ in the equation, we get

$$\begin{aligned} x^2-\sqrt{2}x-4 &= \left(-\sqrt{2}\right)^2-\sqrt{2}\left(-\sqrt{2}\right)-4 \\ &= 2+2-4 \\ &= 0 \end{aligned}$$

Hence $x=-\sqrt{2}$ is a solution of the quadratic equation.

Also, if $x=-2\sqrt{2}$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=-2\sqrt{2}$ in the equation, we get

$$\begin{aligned} x^2-\sqrt{2}x-4 &= \left(-2\sqrt{2}\right)^2-\sqrt{2}\left(-2\sqrt{2}\right)-4 \\ &= 8+4-4 \\ &= 8 \end{aligned}$$

Hence $x=-2\sqrt{2}$ is not a solution of the quadratic equation.

Therefore, from the above results we find out that $x=-\sqrt{2}$ is a solution but $x=-2\sqrt{2}$ is not a solution of the given quadratic equation.

(vii) We have been given that,

$a^2x^2-3abx+2b^2=0, x=\frac{a}{b}, x=\frac{b}{a}$

Now if $x=\frac{a}{b}$ is a solution of the equation then it should satisfy the equation.

So, substituting $x=\frac{a}{b}$ in the equation, we get

$$\begin{aligned} a^2x^2-3abx+2b^2 &= a^2\left(\frac{a}{b}\right)^2-3ab\left(\frac{a}{b}\right)+2b^2 \\ &= \frac{a^4-3a^2b^2+2b^4}{b^2} \end{aligned}$$

Hence $x=\frac{a}{b}$ is not a solution of the quadratic equation.

Also, if $x=\frac{b}{a}$ is a solution of the equation then it should satisfy the equation

So, substituting $x=\frac{b}{a}$ in the equation, we get

$$\begin{aligned} a^2x^2-3abx+2b^2 &= a^2\left(\frac{b}{a}\right)^2-3ab\left(\frac{b}{a}\right)+2b^2 \\ &= b^2-3b^2+2b^2 \\ &= 0 \end{aligned}$$

Hence $x=\frac{b}{a}$ is a solution of the quadratic equation.

Therefore, from the above results we find out that $x=\frac{a}{b}$ is not a solution and $x=\frac{b}{a}$ is a solution of the quadratic equation given.

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