

Answer on Question #56572 – Math – Algebra

find the roots of the quadratic equation using factorisation method :- $2x^2 - 2\sqrt{2}x + 1$

Solution

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

Hence, roots are $-\frac{\sqrt{2}}{2} - 1$ and $-\frac{\sqrt{2}}{2} + 1$.

We used the following formulas:

$$(a + b)^2 = a^2 + 2ab + b^2,$$

$$c^2 - d^2 = (c - d)(c + d),$$

where $a = x$, $b = \frac{\sqrt{2}}{2}$, $c = x + \frac{\sqrt{2}}{2}$, $d = 1$.

Answer: $-\frac{\sqrt{2}}{2} - 1$ and $-\frac{\sqrt{2}}{2} + 1$.