

Solve the equation $2x^2 - 8x + 3 = 0$ by completing the square. Give your answers to 2 decimal places.

Solution:

1. Divide by 2 so that the coefficient of x^2 is 1.

$$x^2 - 4x + \frac{3}{2} = 0$$

2. $b = -4$, so $\frac{b}{2} = -2$. Expand $(x - 2)^2$.

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

3. Complete the square.

$$x^2 - 4x + \frac{3}{2} = (x - 2)^2 - \frac{5}{2}$$

4. Use the completed square to rewrite and solve the original equation.

$$x^2 - 4x + \frac{3}{2} = 0, \text{ so } (x - 2)^2 - \frac{5}{2} = 0$$

$$(x - 2)^2 = \frac{5}{2}$$

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

$$x = 2 - \sqrt{\frac{5}{2}} \quad \text{or} \quad x = 2 + \sqrt{\frac{5}{2}}$$

$$\underline{x = 0.42} \quad \text{or} \quad \underline{x = 3.58} \quad (\text{to 2 d.p.})$$