

Quadratic Equation Worksheets (include complex solutions)

1. Solve the equation $9x - 9x^2 = 3 + x + x^2$.

2. Solve the equation $3x^2 - x + 1 = 0$.

3. Solve the equation $6x^4 + 4x^2 - 3x + 2 = 2x^2(3x^2 - 1)$.

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1. Solve the equation $9x - 9x^2 = 3 + x + x^2$.

In standard form, this is the quadratic equation $10x^2 - 8x + 3 = 0$ with $a = 10$, $b = -8$, and $c = 3$.

$$x = -\frac{-(-8) \pm 2\sqrt{-14}}{2(10)} = \frac{8 \pm 2i\sqrt{14}}{20}$$

Thus, the solutions are $\frac{2}{5} + \frac{i\sqrt{14}}{10}$ and $\frac{2}{5} - \frac{i\sqrt{14}}{10}$.

2. Solve the equation $3x^2 - x + 1 = 0$.

This is a quadratic equation with $a = 3$, $b = -1$, and $c = 1$.

$$x = -\frac{-(-1) \pm \sqrt{-11}}{2(3)} = \frac{1 \pm i\sqrt{11}}{6}$$

Thus, the solutions are $\frac{1}{6} + \frac{i\sqrt{11}}{6}$ and $\frac{1}{6} - \frac{i\sqrt{11}}{6}$.

3. Solve the equation $6x^4 + 4x^2 - 3x + 2 = 2x^2(3x^2 - 1)$.

When expanded, this is a quadratic equation with $a = 6$, $b = -3$, and $c = 2$.

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

$$x = \frac{-(-3) \pm \sqrt{\{-39\}}}{2(6)}$$

So, the solutions are $\frac{1}{4} + \frac{i\sqrt{39}}{12}$ and $\frac{1}{4} - \frac{i\sqrt{39}}{12}$.