

Solving Quadratic Equations

Super-Duper Solver

Key

Solve the following equations, using any method of your choice. Then write a complete sentence explaining why you used that method.

1. $2x^2 + 9x + 4 = 0$

~~8~~
~~9~~
1

$$(2x + 1)(x + 4) = 0$$

$$2x + 1 = 0 \quad x + 4 = 0$$

$$2x = -1$$

$$x = -4$$

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

Method: Factoring

Why did you choose your method?

I was able to find factors of 8 that added up to 9 (1, 8), so the equation was factorable.

2. $x^2 + 3x + 6 = 0$

~~6~~
~~3~~
PRIME

$$x = \frac{-3 \pm \sqrt{9 - 4(1)(6)}}{2(1)}$$

$$= \frac{-3 \pm \sqrt{9 - 24}}{2}$$

$$= \frac{-3 \pm \sqrt{-15}}{2}$$

$$x = \frac{-3 \pm i\sqrt{15}}{2}$$

Method: Quadratic Formula

Why did you choose your method?

I could not factor the equation, so I used the quadratic formula.

3. $x^2 - 3x = -5$

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

~~5~~
~~-3~~
PRIME

$$x = \frac{3 \pm \sqrt{9 - 4(1)(5)}}{2(1)}$$

$$= \frac{3 \pm \sqrt{9 - 20}}{2}$$

$$= \frac{3 \pm \sqrt{-11}}{2}$$

$$x = \frac{3 \pm i\sqrt{11}}{2}$$

Method: Quad. Form.

Why did you choose your method?

I could not factor the equation, so I used the quadratic formula.

$$\begin{aligned}
 4. \quad 3x^2 + 75 &= 0 \\
 3x^2 &= -75 \\
 x^2 &= -25 \\
 \sqrt{x^2} &= \pm\sqrt{-25} \\
 x &= \pm i\sqrt{25} \\
 &= \pm i \cdot 5
 \end{aligned}$$

$$x = \pm 5i$$

Method: Square Root
 Why did you choose your method?
 I chose the square root method because $b=0$.

$$5. \quad 3x^2 + x - 2 = 0$$

$$(3x-2)(x+1) = 0$$

$$3x-2=0 \quad x+1=0$$

$$3x=2$$

$$x = -1$$

$$x = \frac{2}{3}$$

$$\begin{array}{r}
 -6 \\
 3 \times -2 \\
 \hline
 1
 \end{array}$$

Method: Factoring
 Why did you choose your method?
 I was able to find factors of -6 that added up to 1 (3×-2), so the equation was factorable.

$$6. \quad 2(x+5)^2 + 18 = 0$$

$$2(x+5)^2 + 18 = 0$$

$$2(x+5)^2 = -18$$

$$(x+5)^2 = -9$$

$$\sqrt{(x+5)^2} = \pm\sqrt{-9}$$

$$x+5 = \pm i\sqrt{9}$$

$$x+5 = \pm 3i$$

$$x = -5 \pm 3i$$

Method: SQ Rt
 Why did you choose your method?
 I chose the square root method because the equation was in vertex form.

$$7. \quad 3x^2 + 11x + 10 = 0$$

$$(3x+5)(x+2) = 0$$

$$3x+5=0$$

$$x+2=0$$

$$3x = -5$$

$$x = -2$$

$$x = -\frac{5}{3}$$

$$\begin{array}{r}
 30 \\
 6 \times 5 \\
 \hline
 11
 \end{array}$$

Method: Factoring
 Why did you choose your method?
 I was able to find factors of 30 that added up to 11 (5×6), so the equation was factorable.

12. $16 + x^2 = 0$

$$x^2 = -16$$

$$\sqrt{x^2} = \pm \sqrt{-16}$$

$$x = \pm i\sqrt{16}$$

$$x = \pm 4i$$

Method: Sq Root
Why did you choose your method?

I chose the square root method because there was no "x" term ($b=0$).

13. $-4(x+6)^2 - 100 = 0$

$$-4(x+6)^2 = 100$$

$$(x+6)^2 = -25$$

$$\sqrt{(x+6)^2} = \pm \sqrt{-25}$$

$$x+6 = \pm 5i$$

$$x = -6 \pm 5i$$

Method: SQ Rt
Why did you choose your method?

I chose the square root method because the equation was in Vertex Form.

14. $6x + 2x^2 = -5$

~~Repeat of #11~~

~~PRIME~~
10/6

$$2x^2 + 6x + 5 = 0$$

$$x = \frac{-6 \pm \sqrt{36 - 4(2)(5)}}{2(2)}$$

$$= \frac{-6 \pm \sqrt{-4}}{4}$$

$$x = \frac{-6 \pm 2i}{4}$$

$$x = \frac{-3 \pm i}{2}$$

Method:

Why did you choose your method?
I could not factor the equation, so I used the quadratic equation.

15. $3x^2 + 6x + 4 = 0$

$$x = \frac{-6 \pm \sqrt{36 - 4(3)(4)}}{2(3)}$$

$$= \frac{-6 \pm \sqrt{36 - 48}}{6}$$

$$= \frac{-6 \pm \sqrt{-12}}{6}$$

~~PRIME~~
12/6

$$x = \frac{-6 \pm 2i\sqrt{3}}{6}$$

$$x = \frac{-3 \pm i\sqrt{3}}{3}$$

Method: Quad. Form
Why did you choose your method?

I chose the quadratic formula because I could not factor the equation.

8. $6x^2 + x - 2 = 0$

$(3x + 2)(2x - 1) = 0$

$3x + 2 = 0$

$2x - 1 = 0$

$3x = -2$

$2x = 1$

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

$x = \frac{1}{2}$

~~$\begin{matrix} -12 \\ 4 & -3 \\ 1 \end{matrix}$~~

Method: Factoring
Why did you choose your method?

I was able to find factors of -12 that added up to 1, so the equation was factorable.

9. $-4(x + 5)^2 - 44 = 0$

$-4(x + 5)^2 = 44$

$(x + 5)^2 = -11$

$\sqrt{(x + 5)^2} = \pm \sqrt{-11}$

$x + 5 = \pm i\sqrt{11}$

$x = -5 \pm i\sqrt{11}$

Method: SQRT
Why did you choose your method?

I chose the square root method because the equation was in vertex form.

10. $3x^2 + 8x + 6 = 0$

$x = \frac{-8 \pm \sqrt{64 - 4(3)(6)}}{2(3)}$

$= \frac{-8 \pm \sqrt{64 - 72}}{6}$

$= \frac{-8 \pm \sqrt{-8}}{6}$

~~$\begin{matrix} 18 \\ \text{PRIME} \\ 8 \end{matrix}$~~

$= \frac{-8 \pm i\sqrt{8}}{6}$

$= \frac{-8 \pm 2i\sqrt{2}}{6}$

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

Method: Quadratic Formula
Why did you choose your method?

I chose the quadratic formula because I could not factor the equation.

11. $6x + 2x^2 = 5$

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

$x = \frac{-6 \pm \sqrt{36 - 4(2)(-5)}}{2(2)}$

$= \frac{-6 \pm \sqrt{36 + 120}}{4}$

$= \frac{-6 \pm \sqrt{156}}{4}$

~~$\begin{matrix} -10 \\ \text{PRIME} \\ 6 \end{matrix}$~~

$x = \frac{-6 \pm 2\sqrt{39}}{4}$

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

Method: Quad. Form.
Why did you choose your method?

I chose the quadratic formula because I could not factor the equation.