

Algebra 9-5 Solving Quadratic Equations- Day I

Warm-Up

Simplify 1-3.

1. 3 ± 4

$3 + 4 = 7$
 $3 - 4 = -1$

2. $\frac{3 \pm 4}{2}$

$\frac{3+4}{2} = \frac{7}{2}$
 $\frac{3-4}{2} = \frac{-1}{2}$

3. $\frac{-2 \pm 10}{4}$

$\frac{-2+10}{4} = \frac{8}{4} = 2$
 $\frac{-2-10}{4} = \frac{-12}{4} = -3$

Evaluate each expression when $a = 4$, $b = -5$ and $c = 1$.

4. $-b$

$-(-5) = 5$

5. $b^2 - 4ac$

$(-5)^2 - 4(4)(1)$
 $25 - 16 = 9$

6. $\sqrt{b^2 - 4ac}$

$\sqrt{9} = 3$

7. $-b + \sqrt{b^2 - 4ac}$

$-(-5) + \sqrt{9}$

$5 + 3$

8

8. $-b - \sqrt{b^2 - 4ac}$

$-(-5) - \sqrt{9}$

$5 - 3$

2

10. $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$\frac{5 \pm \sqrt{9}}{2(4)} = \frac{5 \pm 3}{8}$

$\frac{5+3}{8} = \frac{8}{8} = 1$

$\frac{5-3}{8} = \frac{2}{8} = \frac{1}{4}$

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The Quadratic Formula

If $ax^2 + bx + c = 0$ and $a \neq 0$, then we can solve for x .

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Standard Form: $ax^2 + bx + c = 0$

Memorize!

Identify a, b, and c values for each equation for numbers 1-6.

$$ax^2 + bx + c = 0$$

1. $x^2 + 2x + 27 = 0$ a = 1 b = 2 c = 27

2. $-t^2 + 1.5t - 10 = 0$ a = -1 b = 1.5 c = -10

3. $3f^2 - 6f - 45 = 0$ a = 3 b = -6 c = -45

4. $n^2 - 3n = 14$ a = 1 b = -3 c = -14

$n^2 - 3n - 14 = 0$

5. $m^2 - 2m = 0$ a = 1 b = -2 c = 0

$m^2 - 2m + 0 = 0$

6. $3x = 2x^2 - 12$ a = 2 b = -3 c = -12

$-3x \quad -3x$

$0 = 2x^2 - 3x - 12$

Use the quadratic formula to solve each equation for the given variable.

7. Solve for t . $3t^2 - 6t - 45 = 0$ $a = 3, b = -6, c = -45$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$t = \frac{6 \pm \sqrt{36 - 4(3)(-45)}}{2(3)} = \frac{6 \pm \sqrt{576}}{6} = \frac{6 \pm 24}{6}$$

$\frac{6+24}{6} = \frac{30}{6} = 5$

8. Solve for m . $m^2 - 3m = 14$ $m^2 - 3m - 14 = 0$ $a = 1, b = -3, c = -14$

$$m = \frac{-b \pm \sqrt{b^2 - 4ac}}{2(a)}$$

$$m = \frac{3 \pm \sqrt{9 - 4(1)(-14)}}{2(1)} = \frac{3 \pm \sqrt{65}}{2} = \frac{3 \pm 8.1}{2}$$

$\frac{6-24}{6} = \frac{-18}{6} = -3$

$$\frac{3+8.1}{2} = \frac{11.1}{2} = 5.55$$

$$\frac{3-8.1}{2} = \frac{-5.1}{2} = -2.55$$

9. Solve for z. $z^2 - 2z = 0$ $a=1, b=-2, c=0$

$$z = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$z = \frac{2 \pm \sqrt{4 - 4(1)(0)}}{2(1)} =$$

$$\frac{2 \pm \sqrt{4}}{2} = \frac{2 \pm 2}{2}$$

$$\frac{2-2}{2} = \frac{0}{2} = 0$$

$$\frac{2+2}{2} = \frac{4}{2} = 2$$

Assignment: 9-5 #'s 1-3, 10-13