

DO NOW

What methods have we learned to solve a quadratic equation?

1. Set = 0 ; factor
2. Completing the square
3. graph $\rightarrow$ x-intercepts
4. table $\rightarrow$ y=0

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8.8 The Quadratic Formula

*** used to solve unfactorable quadratic equations

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

Procedure:

1. Write the equation in standard form.
2. Identify $a =$, $b =$, and $c =$.
3. Write the quadratic formula.
4. Substitute
5. Simplify

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Answers from the quadratic formula:

$\rightarrow$ Exact answers will usually contain a radical.

* Only give decimal answers if asked to approximate.

Examples:

1. $4x^2 - 12 = 5x$

$$4x^2 - 5x - 12 = 0$$

$$a = 4$$

$$b = -5$$

$$c = -12$$

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

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(4)(-12)}}{2(4)}$$

$$x = \frac{5 \pm \sqrt{25 - 16(-12)}}{8}$$

$$x = \frac{5 \pm \sqrt{25 + 192}}{8}$$

$$x = \frac{5 \pm \sqrt{217}}{8}$$

2. $2x^2 + 4x = 14$

$$2x^2 + 4x - 14 = 0$$

$$a = 2$$

$$b = 4$$

$$c = -14$$

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

$$x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-14)}}{2(2)}$$

$$x = \frac{-4 \pm \sqrt{16 - 8(-14)}}{4}$$

$$x = \frac{-4 \pm \sqrt{16 + 112}}{4}$$

$$x = \frac{-4 \pm \sqrt{128}}{4}$$

$$x = \frac{-4 \pm \sqrt{64} \sqrt{2}}{4}$$

$$x = \frac{-4 \pm 8\sqrt{2}}{4}$$

$$x = \frac{-4}{4} \pm \frac{8\sqrt{2}}{4}$$

$$x = -1 \pm 2\sqrt{2}$$

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3. $3x^2 - 4x = 14$

$$3x^2 - 4x - 14 = 0$$

$$a = 3$$

$$b = -4$$

$$c = -14$$

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

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(3)(-14)}}{2(3)}$$

$$x = \frac{4 \pm \sqrt{16 - 12(-14)}}{6}$$

$$x = \frac{4 \pm \sqrt{16 + 168}}{6}$$

$$x = \frac{4 \pm \sqrt{184}}{6}$$

$$x = \frac{4 \pm \sqrt{4} \sqrt{46}}{6}$$

$$x = \frac{4 \pm 2\sqrt{46}}{6}$$

$$x = \frac{4}{6} \pm \frac{2\sqrt{46}}{6}$$

$$x = \frac{2}{3} \pm \frac{\sqrt{46}}{3}$$

$$x = \frac{2 \pm \sqrt{46}}{3}$$

HOMEWORK

Worksheet - HW 8.8

The Quadratic Formula

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