

Name:

Date:

Goal: Solving quadratic equations

Class/Period:

by the Quadratic Formula

Questions/Main Ideas:

Notes:

How do you solve Quadratics Equations using the Quadratic formula

Vocabulary:
Quadratic Formula

Warm up:

Evaluate the expression for the given value of x.

1) $15 - (-x) + 9$

When $x = 2$

$$15 - (-2) + 9$$

$$26$$

2) $14 - x + 3$

When $x = 8$

$$14 - 8 + 3$$

$$9$$

The Quadratic Formula

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

In order to use the Quadratic formula the equation must be equal to zero.

Steps to Using the Quadratic Formula:

Step 1: The equation must equal zero.

Step 2: Identify a, b, c

Step 3: Plug in a, b, c

Step 4: Simplify

Solve:

$$4x^2 = -9x + 9$$

Step 1:

$$\begin{aligned} 4x^2 &= -9x + 9 \\ \frac{-4x^2 \quad -4x^2}{0} &= -4x^2 - 9x + 9 \end{aligned}$$

Step 2:

$$a = -4$$

$$b = -9$$

$$c = 9$$

Step 3:

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

$$x = \frac{-(-9) \pm \sqrt{(-9)^2 - 4(-4)(9)}}{2(-4)}$$

Step 4:

$$x = \frac{9 \pm \sqrt{81 + 144}}{-8} = \frac{9 \pm \sqrt{225}}{-8}$$

$$= \frac{9 \pm 15}{-8} \Rightarrow \frac{9 + 15}{-8} = \frac{24}{-8} = -3$$

$$\downarrow$$
$$\frac{9 - 15}{-8} = \frac{-6}{-8} = \frac{3}{4}$$

Solve:

$$2x^2 - 7 = x$$

$$2x^2 - x - 7 = 0$$

$$a = 2$$

$$b = -1$$

$$c = -7$$

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

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(2)(-7)}}{2(2)}$$

$$x = \frac{1 \pm \sqrt{1 + 56}}{4}$$

$$x = \frac{1 \pm \sqrt{57}}{4} \rightarrow \boxed{\frac{1 + \sqrt{57}}{4}} = \frac{8.55}{4} = 2.14$$

$$\boxed{\frac{1 - \sqrt{57}}{4}} = \frac{-6.55}{4} = -1.64$$

Solve:

$$x^2 - 8x + 16 = 0$$

$$x^2 - 8x + 16 = 0$$

$$a = 1$$

$$b = -8$$

$$c = 16$$

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

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(16)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{64 - 64}}{2}$$

$$x = \frac{8 \pm \sqrt{0}}{2}$$

$$x = \frac{8}{2} = 4$$

Solve

$$4x^2 = 7x + 2$$

$$4x^2 = 7x + 2$$
$$\underline{-4x^2 \quad -4x^2}$$

$$4x^2 = 7x + 2$$

$$0 = -4x^2 + 7x + 2$$

$$a = -4$$

$$b = 7$$

$$c = 2$$

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

$$x = \frac{-(7) \pm \sqrt{(7)^2 - 4(-4)(2)}}{2(-4)}$$

$$x = \frac{-7 \pm \sqrt{49 + 32}}{-8}$$

$$x = \frac{-7 \pm \sqrt{81}}{-8}$$

$$x = \frac{-7 \pm 9}{-8} \Rightarrow \frac{-7 + 9}{-8} = \frac{2}{-8} = \left(-\frac{1}{4}\right)$$

$$\frac{-7 - 9}{-8} = \frac{-16}{-8} = (2)$$

Solve:

$$3n^2 - 5n = -1$$

+1 +1

$$3n^2 - 5n + 1 = 0$$

$$a = 3$$

$$b = -5$$

$$c = 1$$

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

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

$$x = \frac{5 \pm \sqrt{25 - 12}}{6}$$

$$x = \frac{5 \pm \sqrt{13}}{6} \Rightarrow \frac{5 + \sqrt{13}}{6} = 1.43$$

$$\downarrow$$
$$\frac{5 - \sqrt{13}}{6} = .23$$