11/28/17 ①

Solving by the Quadratic Formula

Quadratic Formula

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

Everything must be on the same side of the equals sign before solving

① $ax^2+bx+c=0$

② $a=$ $b=$ $c=$

③ Replace a, b, c in formula using parenthesis

④ Simplify (start with radical)

Question #1
Use the quadratic formula to find the zeros.

$$f(x) = 1x^2 - 6x + 3$$

$$x = 3 \pm \sqrt{6}$$

$a=1$ $b=-6$ $c=3$

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

$$x = \frac{6 \pm \sqrt{24}}{2}$$

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

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

Question #2
Use the quadratic formula to find the zeros.

$$f(x) = x^2 + 9x + 10$$

$$x = \frac{-9}{2} \pm \frac{\sqrt{41}}{2}$$

$a=1 \quad b=9 \quad c=10$

$$x = \frac{-(9) \pm \sqrt{(9)^2-4(1)(10)}}{2(1)}$$

$$x = \frac{-9 \pm \sqrt{41}}{2} = -\frac{9}{2} \pm \frac{\sqrt{41}}{2}$$

Question #3
Use the quadratic formula to find the zeros.

$$2x^2 - 4 = 5x$$
$$-5x \quad -5x$$

$$x = \frac{5}{4} \pm \frac{\sqrt{57}}{4}$$

$$2x^2 - 4 = 5x$$
$$-5x \quad -5x$$

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

$a=2 \quad b=-5 \quad c=-4$

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

$$x = \frac{5 \pm \sqrt{57}}{4} = \frac{5}{4} \pm \frac{\sqrt{57}}{4}$$

Question #4
Use the quadratic formula to find the zeros.

$$2x^2 - 4x = 1$$

$$x = 1 \pm \frac{\sqrt{6}}{2}$$

$$2x^2 - 4x = 1$$
$$-1 \quad -1$$

$$2x^2 - 4x - 1 = 0$$

$a=2 \quad b=-4 \quad c=-1$

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

$$x = \frac{4 \pm \sqrt{24}}{4} = \frac{4 \pm 2\sqrt{6}}{4}$$

$$x = \frac{4}{4} \pm \frac{2\sqrt{6}}{4} = \boxed{1 \pm \frac{\sqrt{6}}{2}}$$

What is the Quadratic Formula?

It gives the solutions of the equation $ax^2 + bx + c = 0$.

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

$3x^2 - 16 = 0$
$a = 3 \quad b = 0 \quad c = -16$

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

a = 2 **b** = 6 **c** = -5

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

$x = \frac{-6 \pm \sqrt{76}}{4}$

$x = \frac{-6 \pm 2\sqrt{19}}{4} = -\frac{6}{4} \pm \frac{2\sqrt{19}}{4}$

$x = -\frac{3}{2} \pm \frac{\sqrt{19}}{2}$ or $\frac{-3 \pm \sqrt{19}}{2}$

$6x^2 - x - 15 = 0$

a = 6 **b** = -1 **c** = -15

$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(6)(-15)}}{2(6)}$

$x = \frac{1 \pm \sqrt{361}}{12}$

$x = \frac{1 \pm 19}{12}$

$\frac{1+19}{12} = \frac{20}{12} = \frac{5}{3}$

$\frac{1-19}{12} = \frac{-18}{12} = -\frac{3}{2}$

$3x^2 - 16x = 0$

a = 3 **b** = -16 **c** = 0

$x = \frac{-(-16) \pm \sqrt{(-16)^2 - 4(3)(0)}}{2(3)}$

$x = \frac{16 \pm \sqrt{256}}{6}$

$x = \frac{16 \pm 16}{6}$

$\frac{16+16}{6} = \frac{32}{6} = \frac{16}{3}$

$\frac{16-16}{6} = 0$

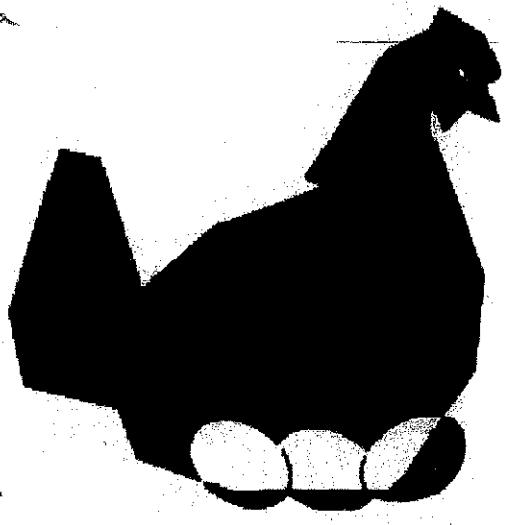
Graphic Organizer by Dale Graham and Linda Meyer
Thomas County Central High School; Thomasville GA

Name _____ Date _____

Using the Quadratic Formula - Guided Lesson

Solve using the quadratic formula.

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



1) $k^2 + 30k + 125 = 0$

$a = 1 \quad b = 30 \quad c = 125$

$$x = \frac{-30 \pm \sqrt{(30)^2 - 4(1)(125)}}{2(1)}$$

$$x = \frac{-30 \pm \sqrt{400}}{2} = \frac{-30 \pm 20}{2}$$

$\frac{-30+20}{2}$ $\quad$ $\frac{-30-20}{2}$

$\frac{-10}{2} = \boxed{-5}$ $\quad$ $\frac{-50}{2} = \boxed{-25}$

2) $3x^2 - 6x - 72 = 0$

$a = 3 \quad b = -6 \quad c = -72$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(3)(-72)}}{2(3)} = \frac{6 \pm \sqrt{900}}{6} = \frac{6 \pm 30}{6}$$

$\frac{6+30}{6} = \boxed{6}$

$\frac{6-30}{6} = \frac{-24}{6} = \boxed{-4}$

3) $x^2 - 6x + 9 = 0$

$a = 1 \quad b = -6 \quad c = 9$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(9)}}{2(1)} = \frac{6 \pm \sqrt{0}}{2} = \frac{6}{2} = \boxed{3}$$