

Secondary Math 2

10/13/16

Thoughtful Thursday-

What do you want to do when you grow up? Why?

SWBAT - derive the quadratic formula by completing the square.

→ 3.5 ←

1. a, b, c

$$f(x) = (x^2 - 2x + \underline{1}) - 3 - \underline{1}$$

$$(x-1)^2 - 4$$

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

Vertex = (1, -4)

2. a, b, c, d, e

$$f(x) = (x^2 - 2x + \underline{1}) - 3 - \underline{1}$$

$$(x-1)^2 - 4$$

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

x-intercepts = -1, 3

f(x) = 0

3. a, b, c, d, e, f, g, h, i

$$f(x) = (x^2 - 6x + \underline{9}) + 4 - \underline{9}$$

$$= (x+3)^2 - 5$$

$$\begin{array}{r} 9 \\ 3 \quad \times \quad 3 \\ \hline 6 \end{array}$$

Vertex = (-3, -5)

line of symmetry x = 3

x-intercepts = 5 and 1

d = 2

f(x) = 0

f(x) = (x-3)^2 - 5

$$0 = (x-3)^2 - 5 \quad +3 \quad \pm \sqrt{5} = x-3$$

$$\begin{array}{r} +5 \\ \hline \end{array} \quad \begin{array}{r} +5 \\ \hline \end{array} \quad \begin{array}{r} +3 \\ \hline \end{array}$$

$\sqrt{5} = (x-3)^2$

$3 \pm \sqrt{5} = x$

(4 a, b, c, d, e, f, g, h, i)

Finding the vertex!

$$f(x) = ax^2 + bx + c$$

$$f(x) = a\left(x^2 + \frac{b}{a}x + \left(\frac{b}{2a}\right)^2\right) + c - \left(\frac{b^2}{4a}\right) - \left(\frac{b}{a} \cdot \frac{1}{2}\right)^2$$

$$f(x) = a\left(x + \frac{b}{2a}\right)^2 + \frac{4ac - b^2}{4a}$$

Solve for x-

$$(4a) \quad 0 = a\left(x + \frac{b}{2a}\right)^2 + \frac{4ac - b^2}{4a} \quad (4a)$$

$$0 = 4a^2\left(x + \frac{b}{2a}\right)^2 + 4ac - b^2$$

$$-4ac = 4a^2\left(x + \frac{b}{2a}\right)^2 - b^2$$

$$\frac{b^2 - 4ac}{4a^2} = \frac{4a^2\left(x + \frac{b}{2a}\right)^2}{4a^2}$$

$$\sqrt{\frac{b^2 - 4ac}{4a^2}} = \sqrt{\left(x + \frac{b}{2a}\right)^2}$$

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

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

$$(4a) \quad \frac{c}{1} - \frac{b^2}{4a}$$

$$(4a) \quad \frac{4ac - b^2}{4a}$$

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

When you have a quadratic that can't factor, you have to use the quadratic formula!