Notes: Solving Equations by factoring and the quadratic formula

The Zero Product Property:

If $a \bullet b = 0$, then $a = 0$ or $b = 0$.

I. Solve by factoring.

Steps:

1. Set equations equal to 0.
2. Factor.
3. Set each factor equal to 0.
4. Solve for x.

1. $x^2 + 6x = 16$

2. $3d^3 + 24d^2 = -45d$

3. $x^3 + 25x = 0$

4. $x^3 + 2x^2 - 5x - 10 = 0$

II. The Quadratic Formula

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

5. $x^2 + 2x = 15$

6. $-3x^2 + 4x - 2 = 2$

What do the solutions of quadratic equations tell us about its graph?

Vertex of a parabola:

When we have an equation in the form $y = a(x-h)^2 + k$, the vertex is located at the point (h, k). However, when we are given $y = ax^2 + bx + c$ we would need to *complete the square* if we needed to change our form to see the value of the vertex.

Completing the square:

Ex: (Solve each equation by completing the square)

1. $x^2 + 6x + 11 = 0$

2. $2x^2 - 6x = 8$

So, using this method we can find that $y = ax^2 + bx + c$ becomes:

Using this formula, we can say that the vertex of $y = ax^2 + bx + c$ is (____, _____).