Lesson 4.4 Warm Up (Clickers)

1. Describe the transformations for the parabola $y = -2x^2 - 4$.

2. What is the vertex and axis of symmetry of $y = (x - 2)^2 + 3$.

3. What is the vertex form of $y = 2x^2 - 3x + 2$?

Lesson 4.4 Factoring Quadratic Expressions

Essential Understanding: You can factor many quadratic trinomials ($ax^2 + bx + c$) into products of two binomials.

Recall from algebra 1 when we factored a quadratic trinomial where a = 1, your thought process was "what are factors of c that add/subtract to be b?"

Ex. Factor $x^2 + 9x + 20$

Ex. Factor $x^2 + 14x - 72$

1 Factor:

$$x^2 + 14x + 40$$

Ex. Factor: $-x^2 + 13x - 12$

2 Factor:
$-x^2+14x+32$

When factoring any expression you should FIRST look to see if there is a GCF. Once you have the GCF factored out, look to see if you can factor it again.

Ex. Factor: $6n^2 + 9n$

Ex. Factor: $4x^2 + 20x - 56$

3 Factor:
$9x^2+9x-18$

Factoring quadratic equations where $a \neq 1$ and there is no common factor takes a few more steps.

Ex. Factor $2x^2 + 11x + 12$

Ex. Factor: $4x^2 - 4x - 3$

Ex. Factor: $4x^2 + 7x + 3$

4 Factor:

$$2x^2 - 7x + 6$$

A <u>perfect square trinomial</u> is a trinomial that is the square of a binomial. For example $x^2 + 10x + 25 = (x + 5)^2$ is a perfect square trinomial.

take note **Key Concept** Factoring Perfect Square Trinomials

$a^2 + 2ab + b^2 = (a + b)^2$ $\quad$ $a^2 - 2ab + b^2 = (a - b)^2$

Ex. Factor $4x^2 - 24x + 36$

*To know whether it is a perfect square, take $\sqrt{a}$ and $\sqrt{b}$. If $b = 2\sqrt{a}\sqrt{b}$, then it is a perfect square.

Ex. Factor: $64x^2 - 16x + 1$

Ex. Factor: $81x^2 + 36x + 4$

The previous problems were perfect square trinomials. There are also difference of perfect squares, which are binomials.

take note **Key Concept** Factoring Perfect Square Trinomials

$a^2 + 2ab + b^2 = (a + b)^2$ $\quad$ $a^2 - 2ab + b^2 = (a - b)^2$

Ex. Factor: $16x^2 - 49$

5 Factor:

$4x^2 - 20x + 25$

6 Factor:

$25x^2 - 81$

7 Factor:

$$16x^4 - 49y^2$$