Tuesday October 21

Warm Up:

Evaluate each expression if a = -2, b = 3 and c = 4

1. $2a + (b + 3)^2$

$2(-2) + (3+3)^2$

$-4 + (6)^2$

$-4 + 36$

$\boxed{32}$

2. $a^2 - 3b - c$

$(-2)^2 - 3(3) - (4)$

$4 - 9 - 4$

$\boxed{-9}$

New Vocabulary

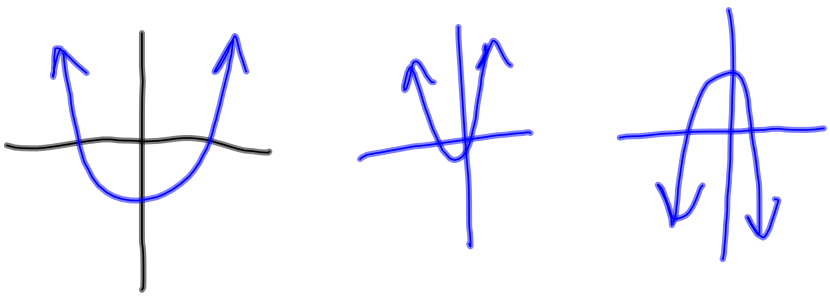
- quadratic function
- quadratic term
- linear term
- constant term
- parabola
- axis of symmetry
- vertex
- maximum value
- minimum value

A quadratic function is a function where the greatest exponent is 2. a, b, & c are coeff.

$f(x) = ax^2 + bx + c$ $a \neq 0$

Quadratic Term | Linear Term | Constant Term

The graph of a quadratic is a parabola.



Parts of a quadratic

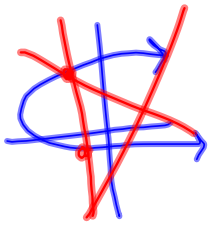
an equation

alg.

- **Axis of symmetry**: the line through the graph that divides the parabola into 2 congruent halves.
- **Vertex**: the *single* point on the parabola that intersects the axis of symmetry.

an ordered pair

- **Maximum/minimum** a value (#)
- **Y-intercept**: the point where they graph intersects the y-axis (where x = 0).



calc

- **X-intercept**: the point(s) where the graph intersects the x-axis (where y = 0).

KeyConcept Graph of a Quadratic Function—Parabola

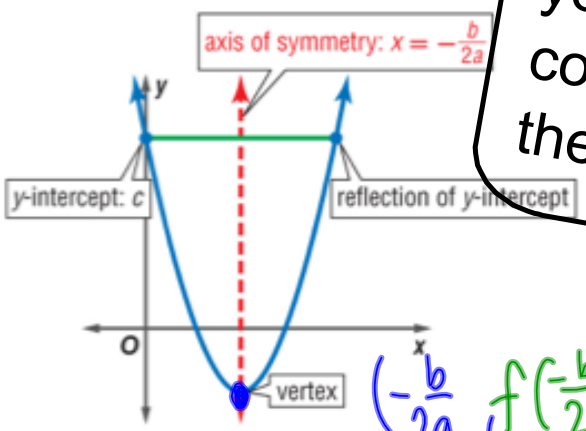
Words

Consider the graph of $y = ax^2 + bx + c$, where $a \neq 0$.

- The y-intercept is $a(0)^2 + b(0) + c$ or c. $(0, c)$ → coeff.
- The equation of the axis of symmetry is $x = -\frac{b}{2a}$.
- The x-coordinate of the vertex is $-\frac{b}{2a}$.

How would you find the coordinates of the vertex?

Model



$\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

plug into function

Think - Write - Pair - Share

1. Think about how you know if a quadratic will have a maximum or minimum value. Where does that value occur?

2. Write your thoughts in 1-2 complete sentences in your notes.

Think - Write - Pair - Share

3. Pair up with a "shoe" partner - someone who is wearing the same type of shoe as you.

4. Each partner share what you wrote.

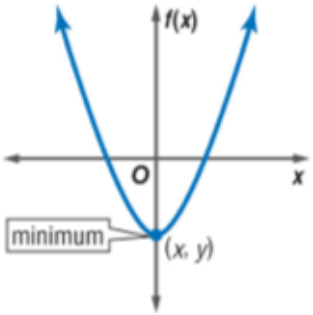
KeyConcept Maximum and Minimum Value

Words The graph of $f(x) = ax^2 + bx + c$, where $a \neq 0$,

- opens up and has a minimum value when $a > 0$, and → a is positive
- opens down and has a maximum value when $a < 0$.

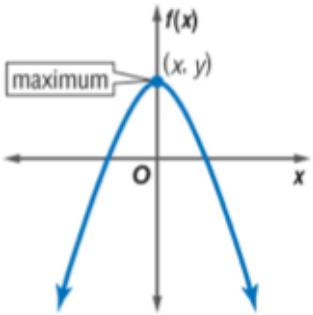
Model

a is positive.



The y-coordinate is the minimum value.

a is negative.



The y-coordinate is the maximum value.

HOMEWORK:

Page 224 #s 12 - 32 Even

- Wait to graph until tomorrow

* Due Friday

12. $f(x) = 4x^2$

18. $f(x) = x^2 - 6x + 8$

y-int: $y = (0)^2 - 6(0) + 8$

$y = 8$

$\boxed{(0, 8)}$

axis of sym: $x = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$

$\boxed{x = 3}$

vertex: $(3, -1)$

$y = (3)^2 - 6(3) + 8$

$= 9 - 18 + 8$

$= -1$