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NOTES: Section 4.1 – Graph Quadratic Functions in Standard Form

Goals: #1 - I can identify the y-intercept, vertex, axis of symmetry, opening direction, and maximum or minimum value from standard form of a quadratic.

#2 - I can graph a quadratic function from standard form.

#3 - I can create a quadratic equation from a word problem and change it into standard form.

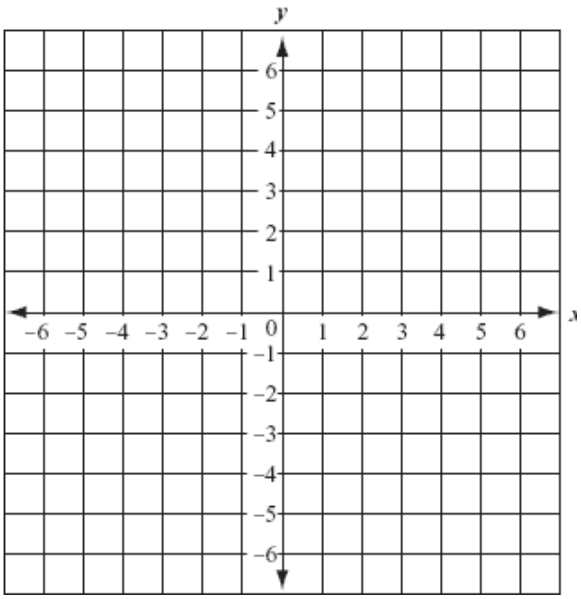


Homework: Lesson 4.1 Worksheet

Exploration #1: Graph the following function using a table of values.

1. $y = -\frac{1}{2}x^2 + 3$

x	y



a. Make some observations about your graph:

b. Do you know what this shape is called?

c. Do you know what type of function this is?

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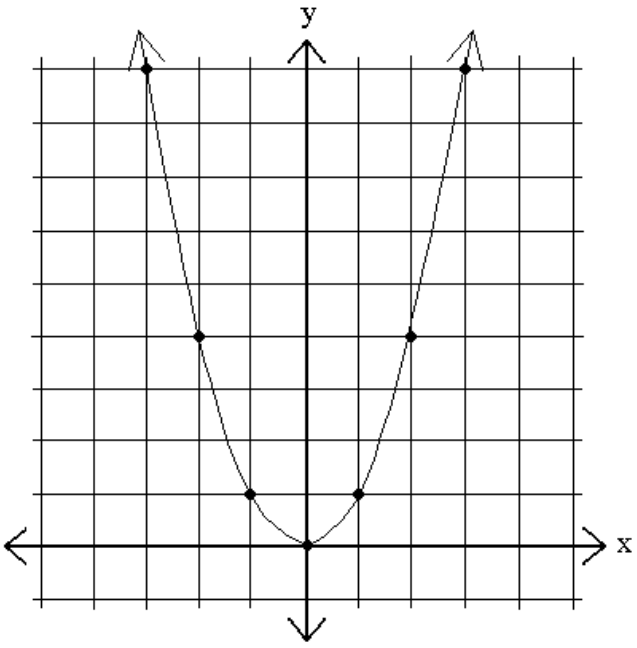
Notes:

A _____ is a function that can be written in the

_____: _____.

The graph of a _____ function is a _____.



Characteristics of Quadratic Functions:

- Parabolas can open _____ or _____.
- The lowest or highest point (min/max value) on a parabola is called the _____.
- The _____ divides the parabola into mirror images and passes through the _____.

Example #1: Graph $y = -2x^2 + 2$. Compare the graph with the graph of $y = x^2$.

AOS: _____

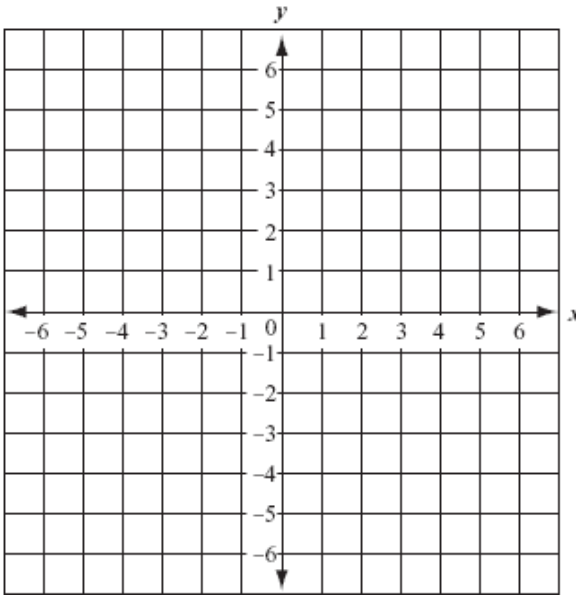
Vertex: _____

Opens: _____

Max./Min. Value: _____

x					
y					

Comparison to $y = x^2$:



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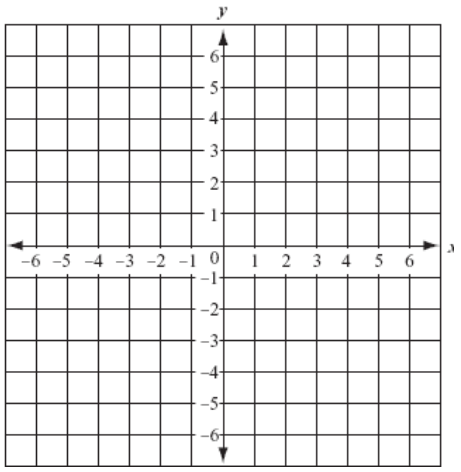
Exploration #2: Graph $y = \frac{1}{3}x^2 + 3$ using a table of values. Answer the following questions.

x	y



a. What is the x-value of the vertex?

b. What is the axis of symmetry?

c. What is the y-intercept?

CHALLENGE: How could we answer questions a-c by looking at the equation only?

Notes:

We can use the following properties to graph *any* quadratic function in _____ form.

$$y = ax^2 + bx + c$$

- The graph opens _____ if _____ and opens _____ if _____.
- The graph gets _____ if _____ and _____ if _____.
- The _____ is _____. This is the same as the _____-coodinate of the _____.
- The _____ is _____.

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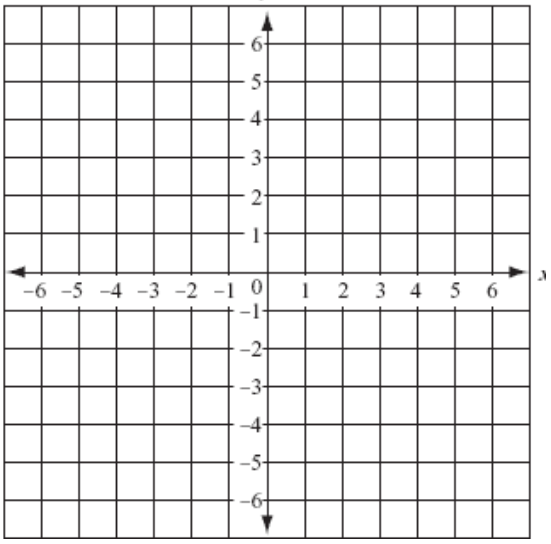
Example #2: Graph $y = -2x^2 + 2$. Compare the graph with the graph of $y = x^2$.



AOS: _____

Vertex: _____

Opens: _____

Max./Min. Value: _____

x					
y					

Comparison to $y = x^2$:

Example #3: Tell whether the function $y = 3x^2 - 18x + 20$ has a *minimum value* or a *maximum value*. Then find the minimum or maximum value.

Example #4: A video store sells about 150 DVDs a week at the price of $20 each. The owner estimates that for each $1 decrease in price, about 25 more DVDs will be sold each week. Create a function that models the store's weekly revenue, R, as a function of the DVD price reduction, x. Then determine the price that the owner should sell DVDs for to maximize revenue.