

LESSON
6-1

Understanding Quadratic Functions

Reteach

To analyze a function of the form $y = ax^2$, where a is not 0, you can take notes about the equation.

Look.

$$y = 3x^2$$

Think.

variable squared
quadratic function
U shaped graph

Look.

$$y = 3x^2$$

Think.

number times variables squared
Point (0, 0) is the highest or
lowest point on the U.

Remember:

The line $x = 0$ divides the U into left and right parts that are identical. The U is symmetric with $x = 0$ as the line of symmetry.

Now look at the number 3, the coefficient of x^2 .

Look.

3 is greater
than 0.

Think.

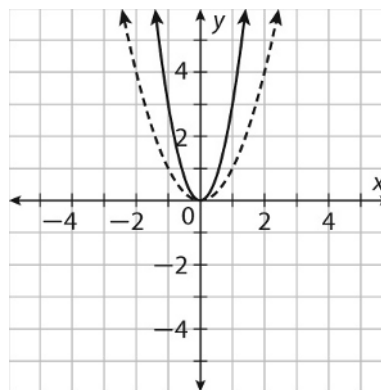
The U opens **upward**.
(0, 0) is the **lowest**
point on the U.

Look.

3 is greater
than 1.
vertical stretch

Think.

The U is **narrower** than
the U that represents
the graph of $y = x^2$.



In this example, the coefficient of x^2 is positive. Use similar thinking when the coefficient is negative. The U will flip over the x-axis of the one shown here.

Answer each question about $y = -3x^2$.

- Does the graph open up or down? _____
- Is (0, 0) the highest (maximum) or lowest (minimum) point on the graph? _____

Answer each question about $y = 0.1x^2$.

- Is the graph wider or more narrow than the graph of $y = x^2$? _____
- What is an equation of the axis of symmetry of the graph? _____

Answer each question about $y = -0.1x^2$.

- Does the graph open up or down? _____
- What are the coordinates of the highest (maximum) or lowest (minimum) point on the graph? _____