# Vertical Stretching of Graphs

# Vertical Stretching of Graphs

▸ We saw that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

# Vertical Stretching of Graphs

that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

# Vertical Stretching of Graphs

▸ We saw that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

# Vertical Stretching of Graphs

that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

**Example:** Find the graph of
$$y = 2 \cdot x^2$$

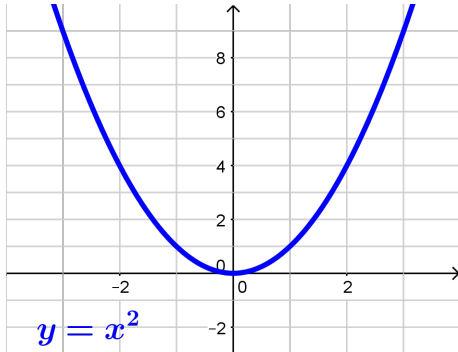# Vertical Stretching of Graphs

▸ We saw that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

**Example:** Find the graph of
$$y = 2 \cdot x^2$$
We will start with the basic graph: $y = x^2$



$y = x^2$

# Vertical Stretching of Graphs

▸ We saw that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$
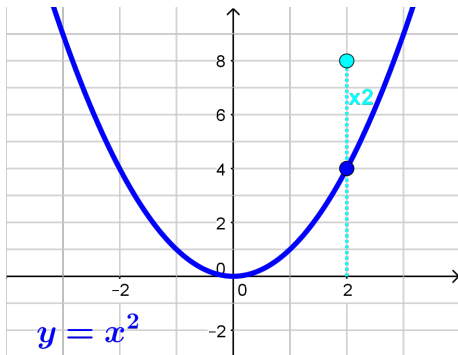
This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

**Example:** Find the graph of

$$y = 2 \cdot x^2$$

We will start with the basic graph: $y = x^2$

At each point, the $y$ value becomes $2$ times as big



$y = x^2$

# Vertical Stretching of Graphs

that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

**Example:** Find the graph of

$$y = 2 \cdot x^2$$

We will start with the basic graph: $y = x^2$

At each point, the $y$ value becomes $2$ times as big

# Vertical Stretching of Graphs

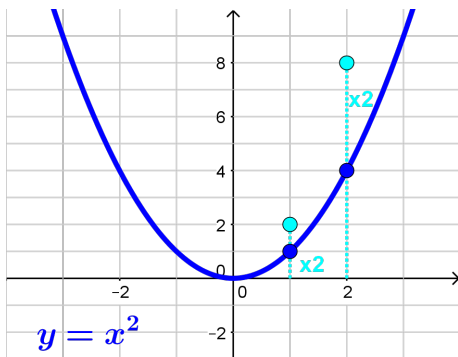We saw that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

**Example:** Find the graph of
$$y = 2 \cdot x^2$$

We will start with the basic graph: $y = x^2$

At each point, the $y$ value becomes $2$ times as big

# Vertical Stretching of Graphs



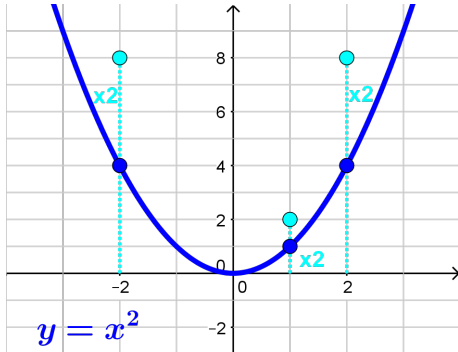▸ We saw that the graph of $y = f(x) + c$ is the graph of $y = f(x)$ shifted vertically by $c$

This is because we were adding $c$ to the formula for $y$

What if instead of adding a number to $f(x)$ we multiply?

**Example:** Find the graph of
$$y = 2 \cdot x^2$$
We will start with the basic graph: $y = x^2$

At each point, the $y$ value becomes $2$ times as big

Doubling $y$ at every point, gives the graph of $y = 2 \cdot x^2$



$y = x^2 \qquad y = 2\,x^2$