

## What's Going On?

**Checking In**

**Minds on**

Graphing  $y = ax^2 + k$

**Action!**

Graphing  $y = (x - h)^2$

**Consolidation**

Crazy old h

**Learning Goal - I will be able to graph quadratic functions in the form  $y = (x - h)^2$ .**

**Minds on**

## Graphing with $a$ and $k$

Explain, in words, how you would graph a parabola in the form  $y = \underline{ax^2} + \underline{k}$ .

$$y = 2x^2 + 5$$

1. Move the vertex up/down by  $k$ .
2. Multiply the general step pattern by  $a$ , and plot our points.

**Action!**

Investigation

**Desmos!**

## Investigation

1. Open Desmos.
2. Graph  $y = (x - h)^2$  and turn on the slider for  $h$ .
3. Play with the slider.
4. Explain what changing the value of  $h$  does to the parabola when  $h$  is positive and when  $h$  is negative.

When the value of  $h$  changes to a negative, the parabola moves left on the  $x$ -axis. When the value of  $h$  changes to a positive, the parabola moves right on the  $x$ -axis.

**Action!**

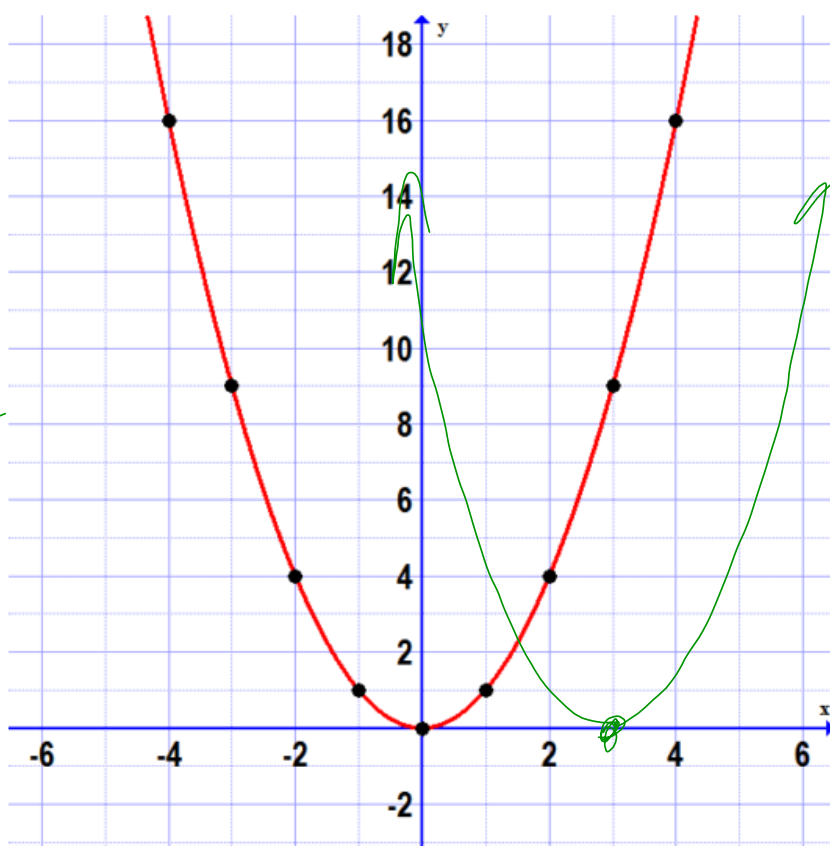
## Graphing $y = (x - h)^2$

Equation

$$y = (x - 3)^2$$

Value of h: 3

$$y = (x - h)^2$$



\*Careful! The value of  $h$  can be tricky. Remember, that the form of the equation is  $(x - h)$ , so we are subtracting the value of  $h$ !

## Action!

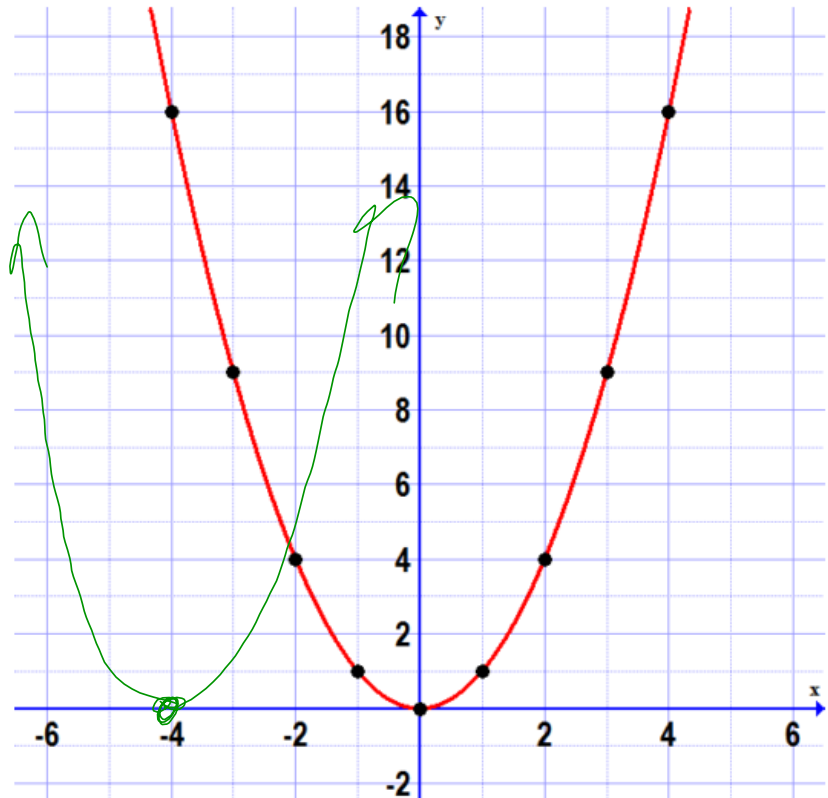
### Graphing $y = (x - h)^2$

Equation

$$y = (x + 4)^2$$

Value of h: \_\_\_\_\_

$$+ 4$$



The value of  $h$  shifts the parabola \_\_\_\_\_

when  $h$  is *positive* and \_\_\_\_\_ when

$h$  is *negative*.

## Consolidation

### Crazy Old $h$ !

For each equation below, state the value of  $h$  and whether the curve has been shifted to the left, or to the right. Or, come up with an equation to match the information given!

| Equation         | $h$ | Shift   |
|------------------|-----|---------|
| $y = (x - 3)^2$  | 3   | Right 3 |
| $y = (x + 1)^2$  | -1  | Left 1  |
| $y = (x + 7)^2$  | -7  | Left 7  |
| $y = (x - 9)^2$  | 9   | Right 9 |
| $y = (x + 10)^2$ | -10 | Left 9  |
| $y = (x + 1)^2$  | -1  | Left 4  |
| $y = (x - 6)^2$  | +6  | Right 6 |

