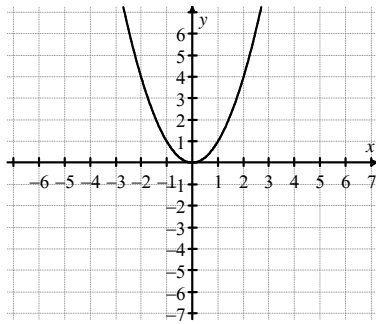




Directions: Each section below represents a specific shift of the graph of $y = x^2$. Graph each equation(s) given on the same graph as $y = x^2$ using your graphing calculator. The graph of $y = x^2$ has been provided for you. Sketch a picture on the graphs provided and label each graph with its corresponding equation. Once this is completed, answer the questions that follow, using your graphs to justify your reasoning.

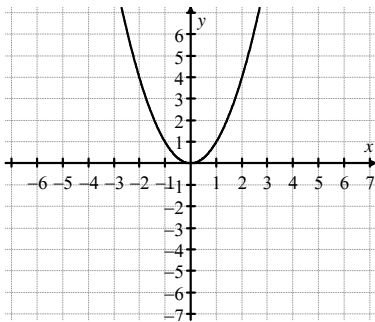
Part A



Graph: $y = -x^2$

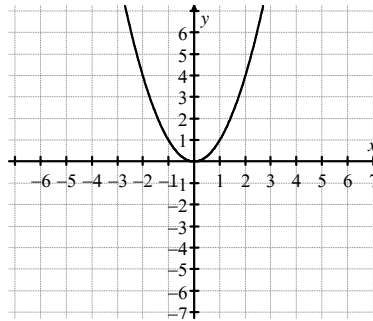
How does the negative sign affect the graph of $y = x^2$?

Part B



$y = 2x^2$

$y = 4x^2$



$y = \frac{1}{2}x^2$

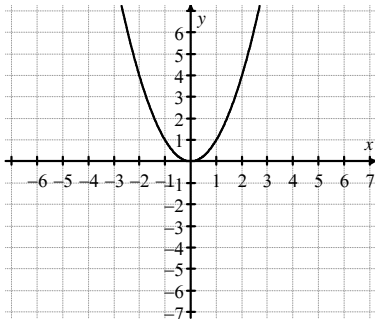
$y = \frac{1}{4}x^2$

What effect does a coefficient greater than one have on the graph $y = x^2$?

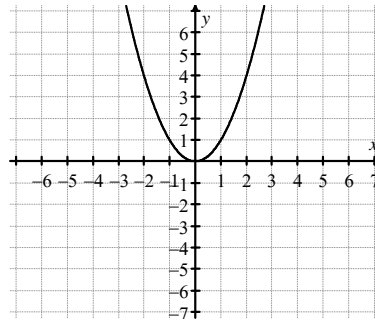
What effect does a coefficient less than one and greater than zero have on the graph of $y = x^2$?



Part C



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

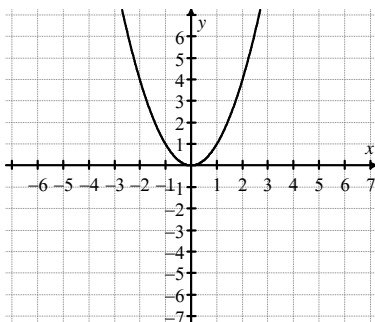


$$y = (x - 2)^2$$

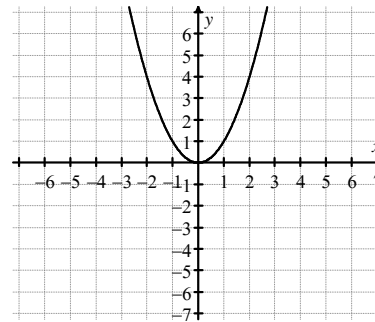
What effect does adding or subtracting a number from x have on the graph of $y = x^2$?

How do you know which direction the graph will move?

Part D



$$y = x^2 + 3$$



$$y = x^2 - 3$$

What effect does adding or subtracting a number from x have on the graph of $y = x^2$?

How do you know which direction the graph will move?

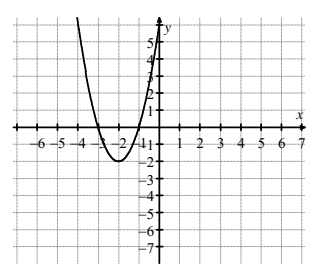
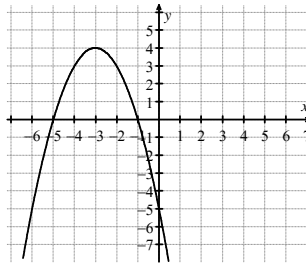
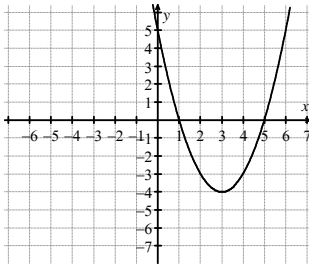
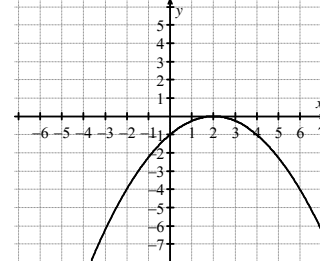
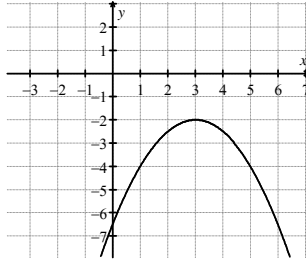
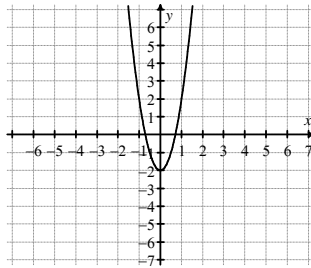


Practice

Match each equation with its graph.

1. $y = 4x^2 - 2$ 2. $y = (x-3)^2 - 4$ 3. $y = 2(x+2)^2 - 2$

4. $y = -\frac{1}{4}(x-2)^2$ 5. $y = -(x+3)^2 + 4$ 6. $y = -\frac{1}{2}(x-3)^2 - 2$



Write an equation of a parabola fitting each description.

1. Reflected over the x-axis, moved 6 to the left. _____
2. Moved 5 to the right and down 2 _____
3. Stretched by a factor of 3, reflected over the x-axis, moved 4 to the right and down 5. _____
4. Shrunk by a factor of 1/10, moved 9 to the left and up 4. _____
5. Reflected over the x-axis, stretched by a factor of 9, moved 1 to the right and up 8. _____

In words, write how the graphs of the following equations will differ from the graph of $y = x^2$. Graph and draw a sketch.

1. $y = \frac{1}{4}(x-2)^2$ 2. $y = -(x+2)^2 + 4$ 3. $y = -(x-3)^2 - 1$ 4. $y = \frac{1}{6}(x+2)^2 + 2$

Difference: Difference: Difference: Difference:

