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Module 14 Graphing Quadratic Relations
Lesson 2 Graphing Quadratic Relations by Analysis

guided notes

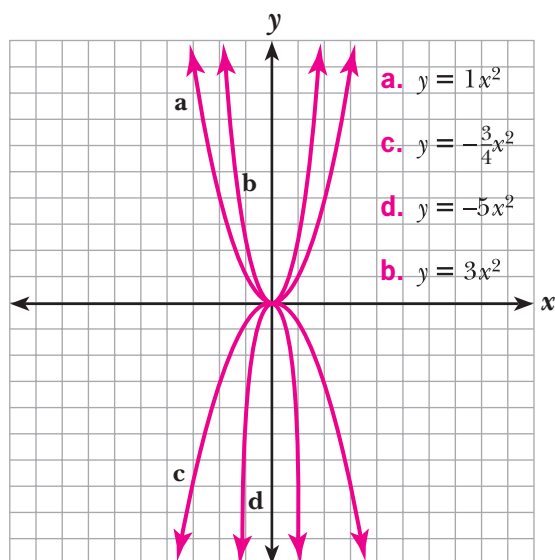
Lesson Objective

- Graph equations in the form $y = a(x - h)^2 + k$.

In the equation $y = ax^2$, if a is positive, the parabola opens **up**.

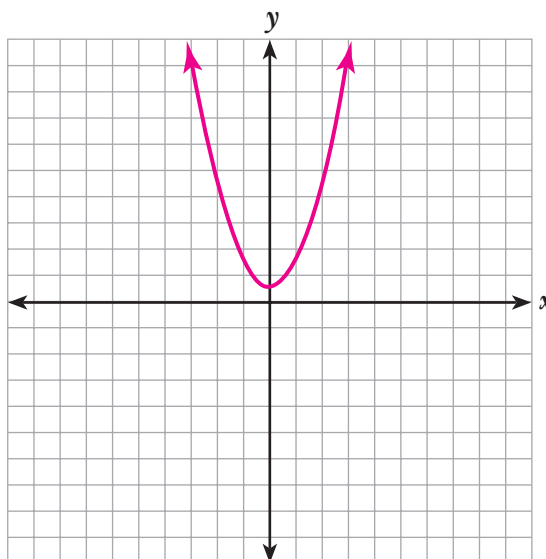
If a is negative, the parabola opens **down**.

- 1 Match each parabola with the correct equation.



If the equation $y = x^2 + k$ is graphed, the vertex is **(0, k)**, and the equation of the axis of symmetry is **$x = 0$** .

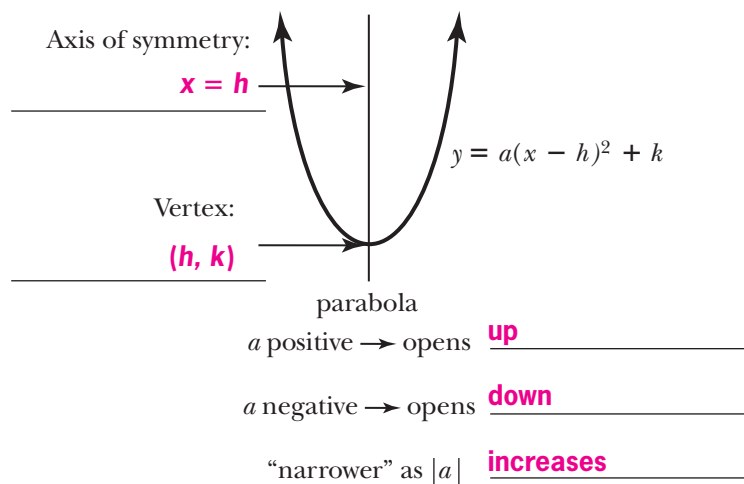
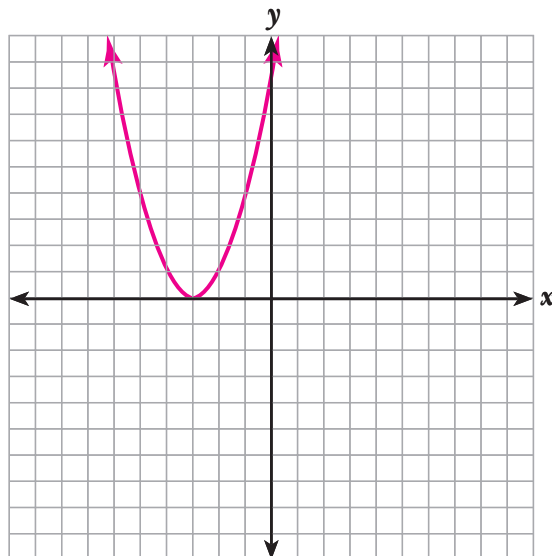
- 2 Find the vertex and axis of symmetry and then, graph $y = x^2 + \frac{2}{3}$.
Vertex: $(0, \frac{2}{3})$, Axis of symmetry: $x = 0$



If the equation $y = (x - h)^2$ is graphed, the vertex is **(h, 0)**, and the equation of the axis of symmetry is **$x = h$** .

- 3 Find the vertex and the axis of symmetry and then, graph $y = (x + 3)^2$.

Vertex: $(-3, 0)$, Axis of symmetry: $x = -3$



- 4 Find the vertex of $y = x^2 - 8x - 3.2$. **Vertex: $(4, -19.2)$**

To write $y = ax^2 + bx + c$ in the form $y = a(x - h)^2 + k$, complete the square.

Example:

$$y = x^2 + 6x + 10$$

$$y - 10 = x^2 + 6x + 10 - 10$$

$$y - 10 = x^2 + 6x$$

$$\frac{1}{2}(6) = 3$$

$$3^2 = 9$$

$$y - 10 + 9 = x^2 + 6x + 9$$

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

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

$$y = (x + 3)^2 + 1$$