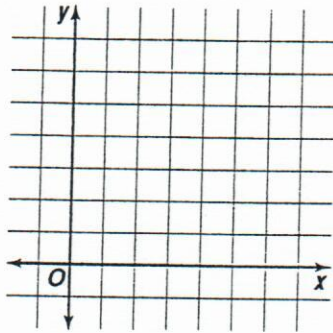


## Practice

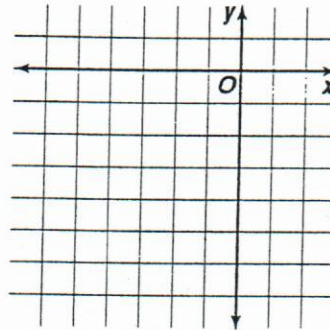
## Parabolas

Name the coordinates of the vertex and focus, the equations of the axis of symmetry and directrix, and the direction of opening of the parabola with the given equation. Then find the length of the latus. Then draw the graph.

1.  $y = 5(x - 3)^2 + 2$

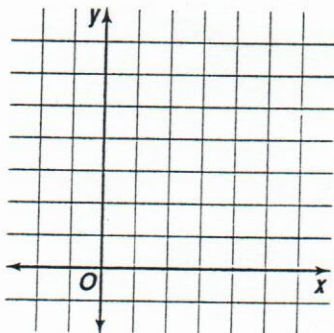


2.  $y = -3(x + 1)^2 - 4$

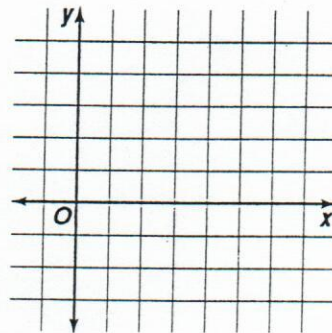


The coordinates of the focus and equation of the directrix of a parabola are given. Write an equation for each parabola. Then draw the graph.

3.  $(3, 2), x = -1$

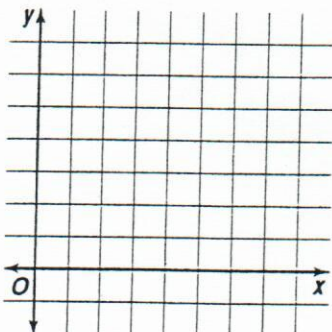


4.  $(4, 1), y = 3$

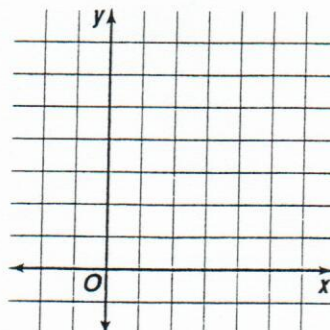


Write the equation of each parabola described below. Then draw the graph.

5. vertex,  $(4, 1)$ ; focus,  $(4, 3)$



6. vertex,  $(1, 2)$ ; focus,  $(6, 2)$



# Study Guide

## Parabolas

A **parabola** is a curve consisting of all points in the coordinate plane that are the same distance from a given point (the focus) and a given line (the directrix). The chart summarizes important information about parabolas.

Information about Parabolas		
Form of equation	$y = a(x - h)^2 + k$	$x = a(y - k)^2 + h$
Axis of symmetry	$x = h$	$y = k$
Vertex	$(h, k)$	$(h, k)$
Focus	$(h, k + \frac{1}{4a})$	$(h + \frac{1}{4a}, k)$
Directrix	$y = k - \frac{1}{4a}$	$x = h - \frac{1}{4a}$
Direction of opening	up ( $a > 0$ ); down ( $a < 0$ )	right ( $a > 0$ ); left ( $a < 0$ )
Length of latus	$ \frac{1}{a} $ units	$ \frac{1}{a} $ units

**Example:** Graph  $y = \frac{1}{4}(x - 2)^2 - 3$ .

vertex:  $(2, -3)$

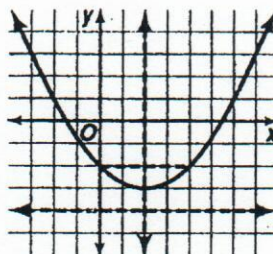
axis of symmetry:  $x = 2$

focus:  $(2, -3 + 1)$  or  $(2, -2)$

directrix:  $y = -3 - 1$  or  $y = -4$

direction of opening: upward, since  $a > 0$

length of latus  $|\frac{1}{\frac{1}{4}}|$  or 4 units



**Name the coordinates of the vertex and focus, the equations of the axis of symmetry and directrix, and the direction of opening of the parabola with the given equation. Then find the length of the latus**

1.  $x^2 = 2y$

2.  $x^2 = y + 2$

3.  $y = x^2 + 4x + 3$

**The coordinates of the focus and the equation of the directrix of a parabola are given. Write an equation for each parabola. Then draw the graph.**

4.  $(3, 5), y = 1$

5.  $(4, -4), y = -6$

6.  $(5, -1), x = 3$

