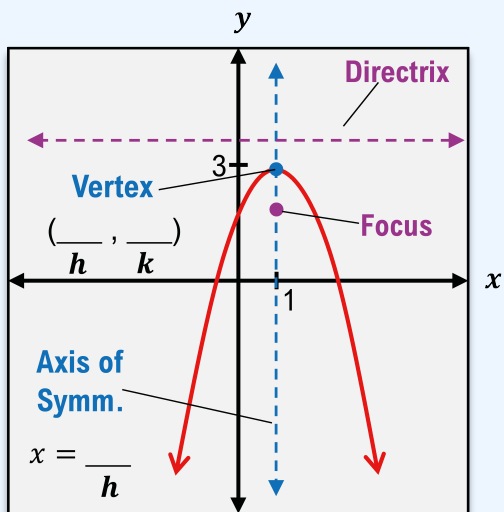
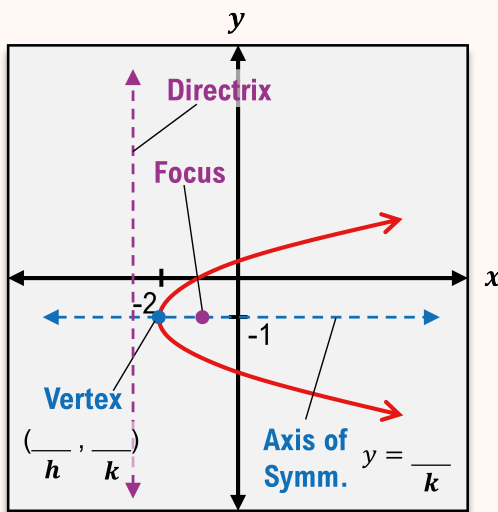


TOPIC: PARABOLAS

Parabolas in Standard Form

◆ Recall: A quadratic $y = a(x - h)^2 + k$ is a parabola that opens ___ or ___ w/ vertex (h, k) & axis of symmetry. $x = h$.

Recall	Vertical Parabolas	New	Horizontal Parabolas
	$y = a(x - h)^2 + k$ a is pos: parabola opens [↑ ↓] a is neg: parabola opens [↑ ↓] $y = -\frac{1}{2}(x - 1)^2 + 3$ 	$x = a(y - k)^2 + h$ a is pos: parabola opens [→ ←] a is neg: parabola opens [→ ←] $x = (y + 1)^2 - 2$ 	

◆ As a conic section, a parabola is all points that are _____ distance from a fixed line (**directrix**) & point (**focus**).

PRACTICE

Find the vertex and axis of symmetry and determine the direction that the parabola opens.

(A) $x = 6y^2$ Parabola opens [↑ ↓ → ←] Vertex: (____, ____) Axis of symmetry: _____	(B) $y = (x + 4)^2 - 9$ Parabola opens [↑ ↓ → ←] Vertex: (____, ____) Axis of symmetry: _____	(C) $x = -2y^2 + 6$ Parabola opens [↑ ↓ → ←] Vertex: (____, ____) Axis of symmetry: _____
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TOPIC: PARABOLAS

Graphing Parabolas

◆ Recall: To graph a parabola, determine the direction, then find the vertex (h, k) , axis of symmetry, and intercepts.

► For the equation of a parabola given in general form, complete the square first, then graph.

Equation → Parabola ↓	General Form	Standard Form
Vertical	$y = ax^2 + bx + c$	$y = a(x - h)^2 + k$
Horizontal	$x = ay^2 + by + c$	$x = a(y - k)^2 + h$

EXAMPLE

Sketch the horizontal parabola represented by the given equation.

$$x = y^2 + 2y - 3$$

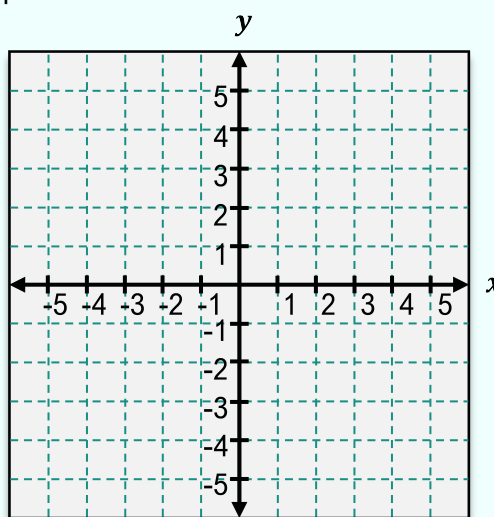
Complete the square:

Parabola opens [↑ | ↓ | → | ←]

Vertex: $(h, k) = (\underline{\quad}, \underline{\quad})$

Axis of Symmetry: $y = k \Rightarrow \underline{\hspace{2cm}}$

Intercepts: When $x = 0$, $y = \underline{\quad}, \underline{\quad}$



◆ If eqn is in general form, you may also use $-\frac{b}{2a}$ (vertex formula) to get the vertex & axis of symmetry.

TOPIC: PARABOLAS

PRACTICE

Determine the Vertex and Axis of Symmetry for the parabola $x = -(y - 1)^2$, and determine which direction the parabola will open.

Parabola opens [$\uparrow$ | $\downarrow$ | $\rightarrow$ | $\leftarrow$]

Vertex:

Axis of Symmetry:

PRACTICE

Determine the Vertex and Axis of Symmetry for the parabola $y = (x + 2)^2$, and determine which direction the parabola will open.

Parabola opens [$\uparrow$ | $\downarrow$ | $\rightarrow$ | $\leftarrow$]

Vertex:

Axis of Symmetry:

TOPIC: PARABOLAS

PRACTICE

Determine the Vertex and Axis of Symmetry for the parabola $x = y^2 + 4y + 2$, and determine which direction the parabola will open.

Parabola opens [$\uparrow$ | $\downarrow$ | $\rightarrow$ | $\leftarrow$]

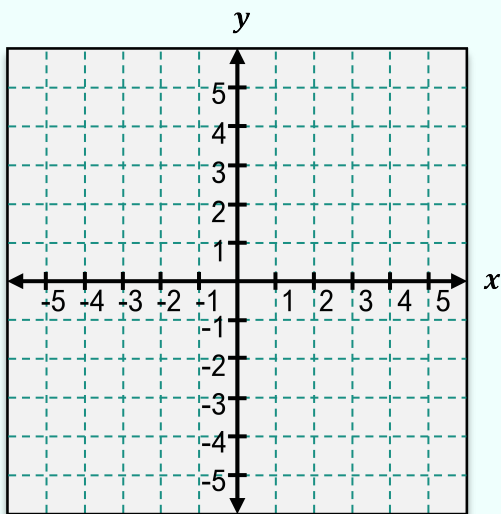
Vertex:

Axis of Symmetry:

EXAMPLE

Use completing the square to write the equation of the parabola in standard form and graph.

(A) $y = x^2 - 6x + 5$



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

