Period 4, April 11, 2025

Latus = 4 · Focal Length

Find the solution set for the system by graphing both of the system's equations in the same rectangular coordinate system and finding points of intersection. Check all solutions in both equations.

$\begin{cases} x = y^2 - 3 \\ x = y^2 - 3y \end{cases}$

$x = y^2 - 3 \Rightarrow (x+3) = y^2$ vertex $(-3, 0)$ focal $\frac{1}{4}$ opens Right Latus $= \frac{1}{4} \cdot 4 = 1$

$x = y^2 - 3y + \frac{9}{4} \Rightarrow x + \frac{9}{4} = (y - \frac{3}{2})^2$ vertex $(-\frac{9}{4}, \frac{3}{2})$

$a = 1$, $b = -3$

$\frac{b}{2a} = -\frac{1}{2} < \frac{-3}{2}$ $(\frac{b}{2a})^2 = (\frac{-3}{2})^2 = \frac{9}{4}$

Use the graphing tool to graph each parabola.

$x = y^2 - 3$

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

$0 = 0 + 3y - 3$

$3y - 3 = 0$

$y = 1$

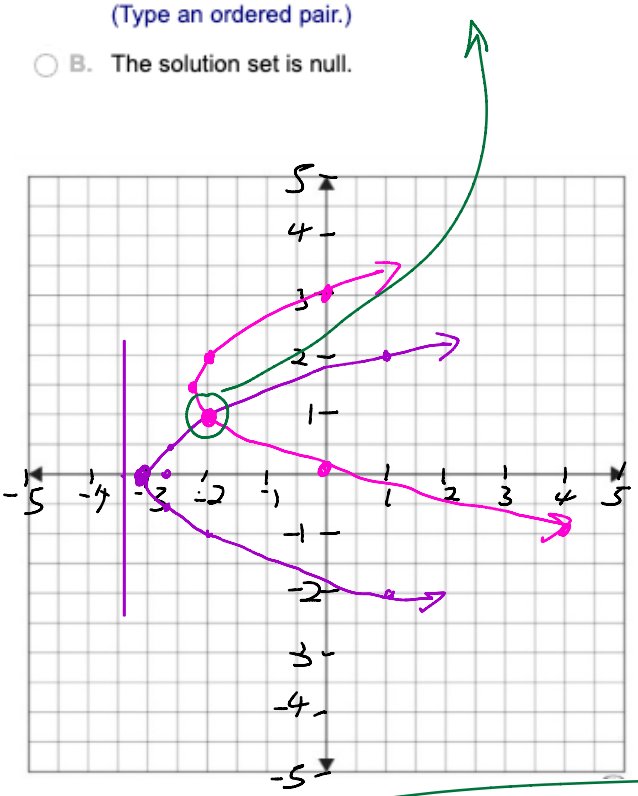
$x = (1)^2 - 3 = -2$

Point $(-2, 1)$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution of the equation is $(-2, 1)$.
(Type an ordered pair.)

B. The solution set is null.



$x = y^2 - 3$

x	y
-3	0
-2	±1
1	±2
6	±3

$x = y^2 - 3y$

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

x	y
$-2\frac{1}{4}$	$\frac{3}{2}$
0	0
-2	1
4	-1
-2	2
0	3

Find the vertex, focus, and directrix of the parabola with the given equation. Then graph the parabola.

$(x-3)^2 = -12(y-3)$ vertex (3,3) opens down $\frac{12}{4} = p = \text{Focal Length} = 3$

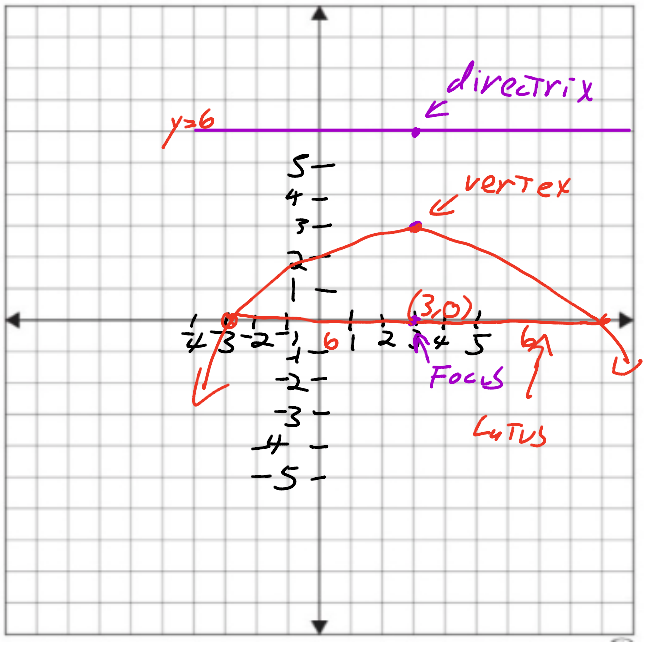
opens down ← Latus $= 4p = 4 \cdot 3 = 12$

The vertex of the parabola is (3,3).
(Type an ordered pair.)

The focus of the parabola is (3,0).
(Type an ordered pair.)

The directrix of the parabola is $y = 6$.
(Type an equation. Simplify your answer.)

Use the graphing tool to graph the parabola only.

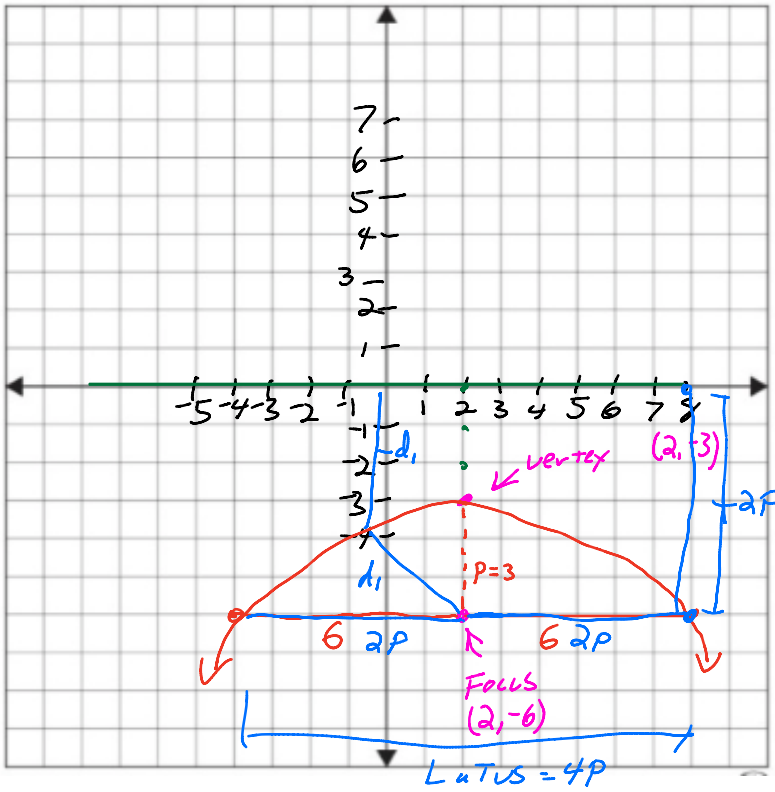


Find the standard form of the equation of the parabola satisfying the given conditions.

Vertex: (2, − 3); Focus: (2, − 6)

The standard form of the equation is $(x-2)^2 = -12(y+3)$.

(Type an equation. Simplify your answer.)



open down

p = Focal Length = 3

LaTus = 4·p = 4·3 = 12

directrix

y = 0

opens down

$-4p(y-k) = (x-h)^2$

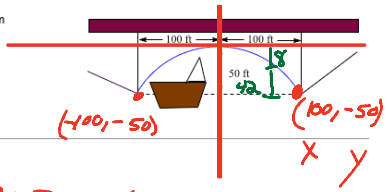
(h, k) ⇒ vertex

(2, -3) ⇒ h = 2 k = -3

$-4(3)(y-(-3)) = (x-2)^2$

$-12(y+3) = (x-2)^2$

The parabolic arch shown in the figure is 50 feet above the water at the center and 200 feet wide at the base. Will a boat that is 30 feet tall clear the arch 40 feet from the center?



$x = 40$

Choose the correct answer below.

- (•) Yes
- ( ) No

$x^2 = -4(50)y$

$x^2 = -200y$

$40^2 = -200y$

$\frac{1600}{-200} = \frac{-200y}{-200}$

$-8 = y$

Vertex (0,0)

Opens down

$x^2 = -4py$

$(100)^2 = -4(p)(-50)$

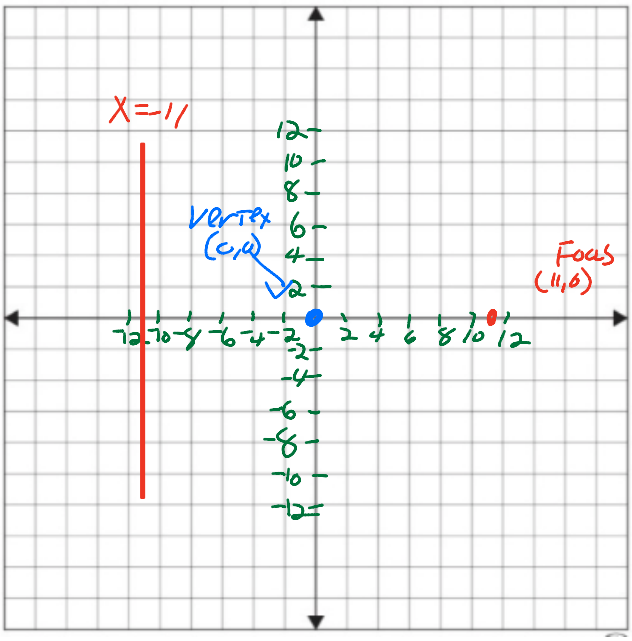
$\frac{10000}{200} = \frac{200p}{200}$

$50 = p$

Find the standard form of the equation of the parabola satisfying the given conditions.

Focus: (11,0); Directrix: $x = -11$

The standard form of the equation is $y^2 = 44x$. (Type an equation. Simplify your answer.)



Opens Right

Focal Length = 11

$y^2 = +4(11)\cdot x$

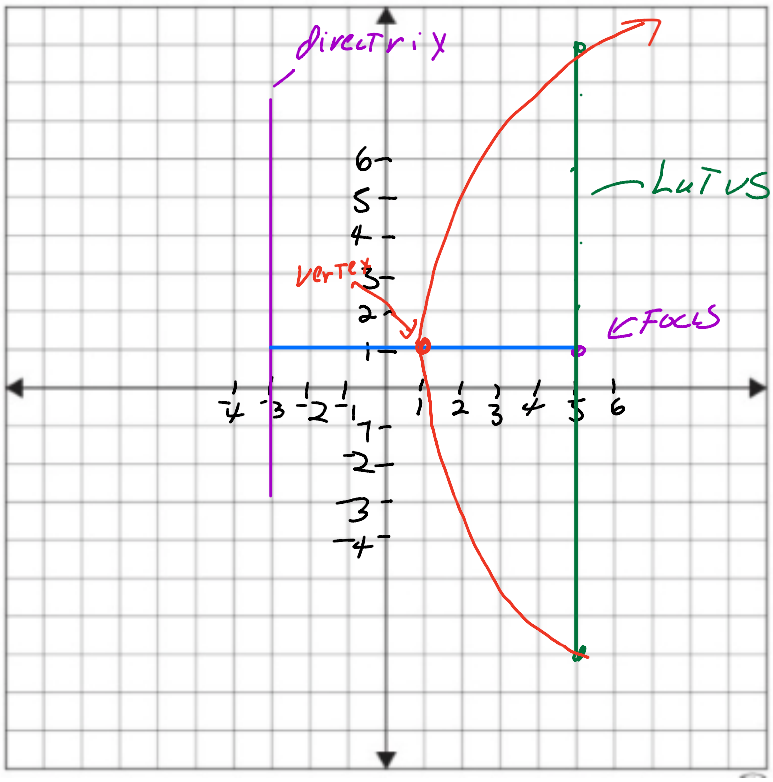
$y^2 = 44x$

Find the standard form of the equation of the parabola satisfying the given conditions.

Focus: (5, 1); Directrix: $x = -3$

The standard form of the equation is $(y-1)^2 = 16(x-1)$.

(Type an equation. Simplify your answer.)



$3+5=8$

Focal Length $=4$

Latus $4 \cdot 4 = 16$

open Right

$(y-k)^2 = 4p(x-h)$

vertex $(1,1)$

$p = 4$

$(y-1)^2 = 4 \cdot 4(x-1)$

$(y-1)^2 = 16(x-1)$