9-1 Additional Practice

Parabolas

Write an equation for a parabola given the focus and directrix.

1. focus (0, 4) and directrix $y = -4$

$y = \frac{1}{16}x^2$

2. focus (3, 0) and directrix $x = -3$

$x = \frac{1}{12}y^2$

3. A parabola has a focus of (−2, 0) and directrix at $x = 2$.

a. What is the vertex of the parabola? **(0, 0)**

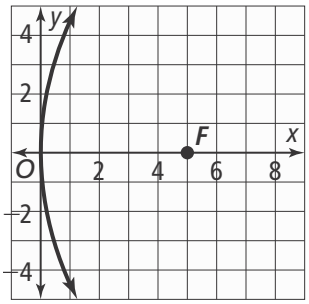
b. Is the equation in the form $y = ax^2$ or $x = ay^2$? $x = ay^2$

c. What is the focal length? **2**

d. What is the equation of the parabola? $x = -\frac{1}{8}y^2$

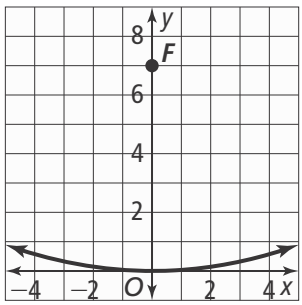
What is the equation of each of the parabolas shown?

4.



$x = \frac{1}{20}y^2$

5.



$y = \frac{1}{28}x^2$

6. A TV satellite dish has the shape of a parabola modeled by the equation $x = \frac{1}{120}y^2$. The satellite dish has a sensor at its focus. Using the graph of the equation and assuming the base of the dish, or vertex, is positioned at the point (0, 0), at what coordinates would the sensor be placed?

(30, 0)

7. Complete the square to identify the vertex, focus, and directrix of the parabola with the equation $0 = -y + x^2 - 6x + 2$.

vertex: (3, −7); focus: (3, −6.75); directrix: $y = -7.25$

8. What is the value of c for the parabola $x = \frac{1}{10}(y + 6)^2 + 2$? Explain.

The value of c is 2.5 because $\frac{1}{4c} = \frac{1}{10}$ and $4 \times 2.5 = 10$.

9. The midpoint of a pipe with a diameter of 0.5 in. is located 10 in. from a mirror with a parabolic cross section used as a solar collector. The midpoint of the pipe is at the focus of the parabola. Write an equation to model the cross section of the mirror.

$y = \frac{1}{40}x^2$