Name Key Date

8.2 Focus of a Parabola

For use with Activity 8.2

Essential Question Why do satellite dishes and spotlight reflectors have parabolic shapes?

1 ACTIVITY: A Property of Satellite Dishes

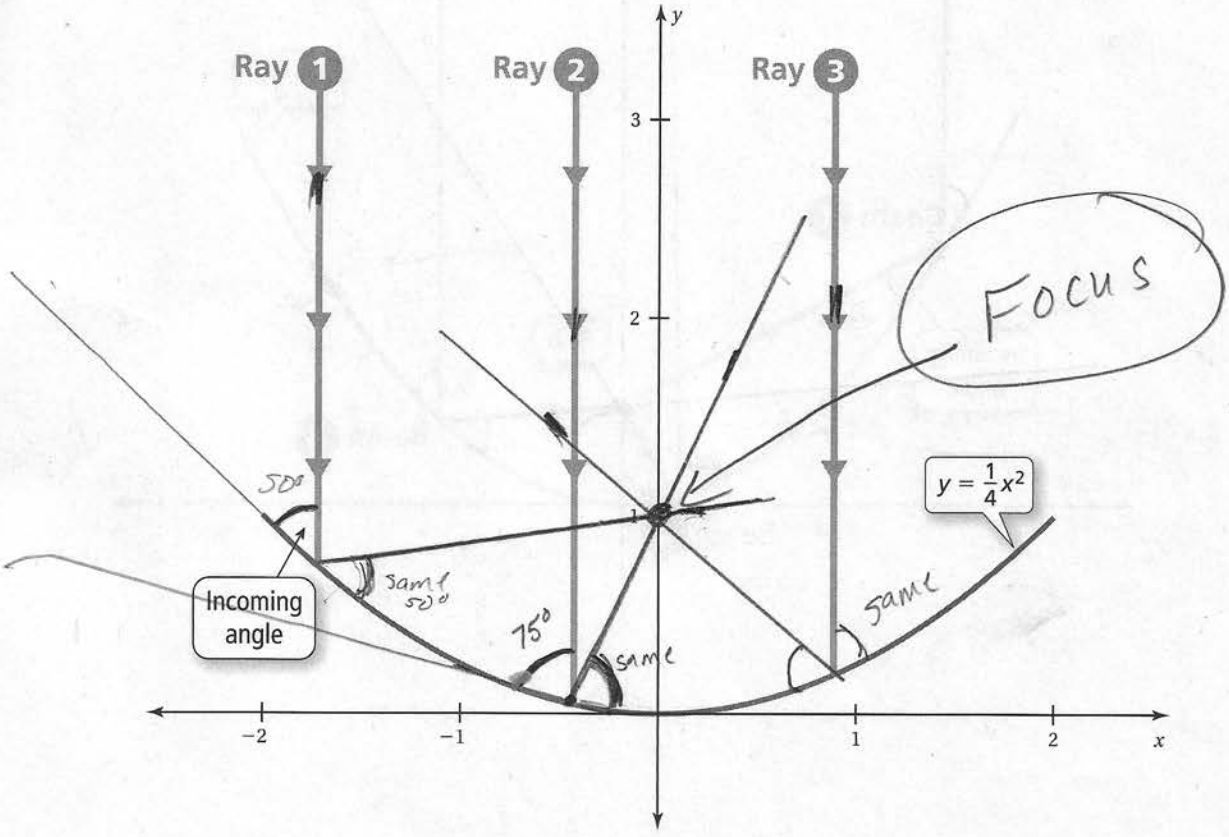
Work with a partner. Rays are coming straight down. When they hit the parabola, they reflect off at the same angle at which they entered.

- Draw the outgoing part of each ray so that it intersects the y-axis.
- What do you notice about where the reflected rays intersect the y-axis?

all go through (0,1)

- Where is the receiver for the satellite dish? Explain.

(0,1) - all lines go through that point.



Name _____ Date _____

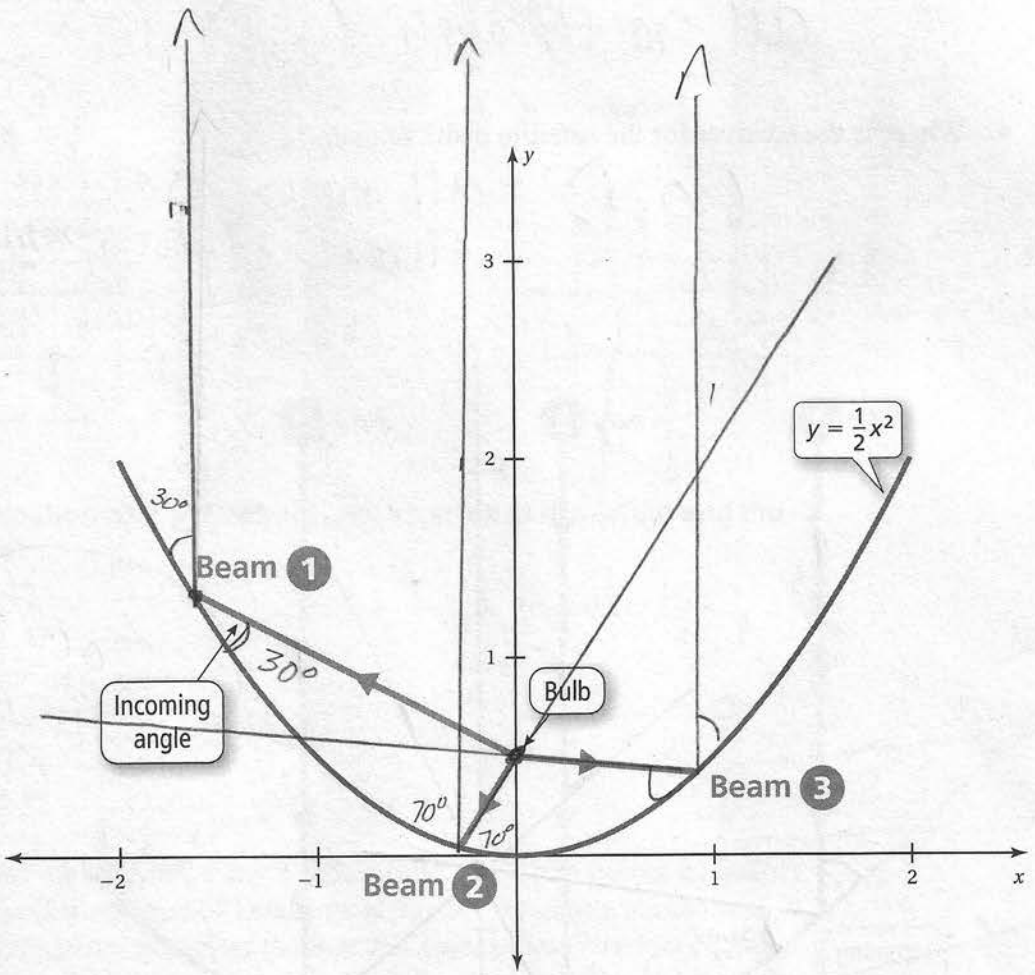
8.2 Focus of a Parabola (continued)

2 ACTIVITY: A Property of Spotlights

Work with a partner. Beams of light are coming from the bulb in a spotlight. When the beams hit the parabola, they reflect off at the same angle at which they entered.

- Draw the outgoing part of each beam. What do they have in common? Explain.

going away -> parallel to axis of summetry.



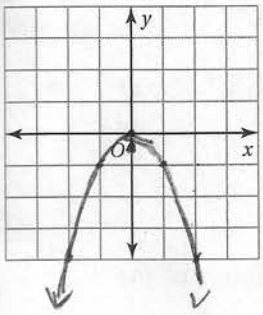
Name _____ Date _____

8.2 Practice

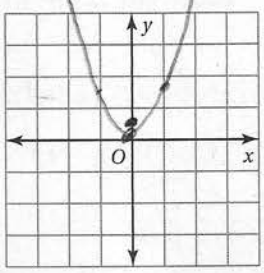
For use after Lesson 8.2

Graph the function. Identify the focus.

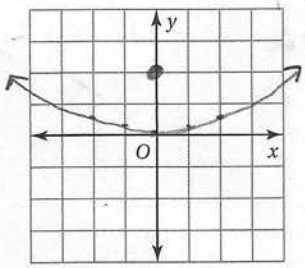
1. $y = -x^2$ $a = -1$ $\frac{1}{4 \cdot -1}$ $(0, -\frac{1}{4})$ Focus



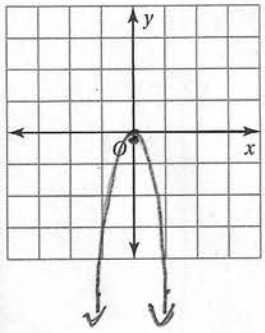
2. $y = \frac{3}{2}x^2$ $\frac{1}{4 \cdot 3/2}$ $(0, \frac{1}{6})$ Focus



3. $y = \frac{1}{8}x^2$ $\frac{1}{4 \cdot 1/8} = \frac{1}{1/2}$ $(0, 2)$ Focus



4. $y = -5x^2$ $\frac{1}{4 \cdot -5}$ $-\frac{1}{20}$ $(0, -1/20)$ Focus

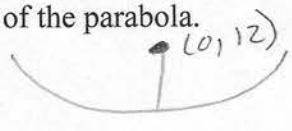


Write an equation of the parabola with a vertex at the origin and the given focus.

5. $(0, 3)$ $\frac{1}{4a} = 3 \cdot 4a$ $1/12$ $y = \frac{1}{12}x^2$

6. $(0, -0.1)$ $\frac{1}{4a} = -.1 \cdot 4a$ $1 = -.4a$ $-2.5 = a$ $y = -2.5x^2$

7. A metal molding company builds a solar furnace to power its factory. The furnace consists of hundreds of mirrors forming a parabolic dish that reflects the energy of the Sun to a focal point. Write an equation for the cross section of the dish when the receiver is 12 feet from the vertex of the parabola.



$\frac{1}{4a} = 12 \cdot 4a$ $1 = 48a$ $y = \frac{1}{48}x^2$