Write an equation for a graph that is the set of all points in the plane that are equidistant from the given point and the given line.

1. $F(0, 2), y = -2$

2. $F(0, -1), y = 1$

3. $F(-3, 0), x = 3$

4. $F(0, -8), y = 8$

5. $F(0, 4), y = 0$

6. $F\left(\frac{1}{2}, 0\right), x = -\frac{1}{2}$

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

7. focus at $(6, 0)$

8. focus at $(0, -4)$

9. focus at $(0, 7)$

10. focus at $(-1, 0)$

11. focus at $(2, 0)$

12. focus at $(0, -5)$

Write an equation of a parabola opening upward with a vertex at the origin.

13. focus 1.5 units from vertex

14. focus $\frac{1}{8}$ of a unit from vertex

15. Optics A cross section of a flashlight reflector is a parabola. The bulb is located at the focus. Suppose the bulb is located $\frac{1}{4}$ in. from the vertex of the reflector. Model a cross section of the reflector by writing an equation of a parabola that opens upward and has its vertex at the origin. What is an advantage of this parabolic design?

Identify the focus and the directrix of the graph of each equation.

16. $y = \frac{1}{4}x^2$

17. $y = x^2$

18. $y = -\frac{1}{8}x^2$

19. $x = \frac{1}{2}y^2$

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

21. $x = \frac{1}{36}y^2$

22. $x = -\frac{1}{18}y^2$

23. $y = -2x^2$