

# Practice 10-2

Parabolas

Determine whether each parabola opens upward, downward, to the left, or to the right.

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|--------------------|--------------------|---------------------|--------------------|
| 1. $x = -2y^2$     | 2. $y = -6x^2$     | 3. $-8x = y^2$      | 4. $-2y = -3x^2$   |
| 5. $-2y + x^2 = 0$ | 6. $2x + 6y^2 = 0$ | 7. $-3x + 4y^2 = 0$ | 8. $y + 12x^2 = 0$ |

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

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|---------------------------|--------------------------|--------------------------|----------------------------|
| 9. $y = -\frac{1}{32}x^2$ | 10. $y = -8x^2$          | 11. $x = \frac{1}{3}y^2$ | 12. $x = 12y^2$            |
| 13. $y + 3x^2 = 0$        | 14. $x - 5y^2 = 0$       | 15. $-y + x^2 = 3$       | 16. $-x - 3y^2 = 0$        |
| 17. $8x = y^2 + 6y + 9$   | 18. $\frac{1}{8}x = y^2$ | 19. $-8y = -x^2$         | 20. $-\frac{1}{8}y = -x^2$ |

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

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|--------------------------|---------------------------|---------------------------|---------------------------|
| 21. focus at $(-2, 0)$   | 22. focus at $(0, 4)$     | 23. directrix at $x = 3$  | 24. directrix at $y = 4$  |
| 25. focus at $(0, -3)$   | 26. directrix at $x = -2$ | 27. directrix at $y = -3$ | 28. focus at $(3, 0)$     |
| 29. directrix at $x = 6$ | 30. focus at $(-5, 0)$    | 31. focus at $(0, 5)$     | 32. directrix at $y = -7$ |

Write the equation whose graph is the set of all points in the plane equidistant from the given point and the given line.

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|----------------------------|------------------------------|----------------------------|
| 33. $F(0, 8)$ and $y = -8$ | 34. $F(1, 0)$ and $x = -1$   | 35. $F(6, 0)$ and $x = -6$ |
| 36. $F(0, -4)$ and $y = 4$ | 37. $F(0, 1)$ and $y = -1$   | 38. $F(-3, 0)$ and $x = 3$ |
| 39. $F(-1, 0)$ and $x = 1$ | 40. $F(-10, 0)$ and $x = 10$ | 41. $F(0, -3)$ and $y = 3$ |
| 42. $F(5, 0)$ and $x = -5$ | 43. $F(0, 5)$ and $y = -5$   | 44. $F(3, 0)$ and $x = -3$ |

45. A pipe with a diameter of 0.5 in. is located 10 in. from a mirror used as a parabolic solar collector. The pipe is at the focus of the parabola.

- Write an equation to model the cross section of the mirror.
- The pipe receives 25 times more sunlight than it would without the mirror. The amount of light collected by the mirror is directly proportional to its diameter. Find the width of the mirror.

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

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| 46. focus 2 units from vertex | 47. focus $\frac{1}{4}$ unit from vertex |
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Identify the vertex, focus, and directrix of the graph of each equation. Then sketch the graph.

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|-------------------------------------|----------------|-------------------------|
| 48. $y + 1 = -\frac{1}{4}(x - 3)^2$ | 49. $x = 2y^2$ | 50. $y^2 - 4x - 2y = 3$ |
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