

Pg. 623

2-20 evens, 23, 25, 27-47 By 4s, 55, 57, (60).

SKILL PRACTICE

1. **VOCABULARY** Copy and complete: A parabola is the set of all points in a plane equidistant from a point called the ? and a line called the ?.

2. **★ WRITING** Compare the graphs of $x^2 = 4py$ and $y^2 = 4px$.

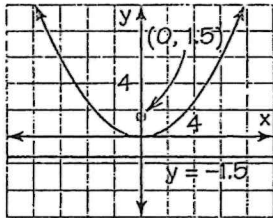
GRAPHING Graph the equation. Identify the focus, directrix, and axis of symmetry of the parabola.

- | | | | |
|------------------------------|----------------------|----------------------|--------------------------------|
| 3. $y^2 = 16x$ | 4. $x^2 = -6y$ | 5. $x^2 = 20y$ | 6. $y^2 = 28x$ |
| 7. $y^2 = -10x$ | 8. $x^2 = 30y$ | 9. $y^2 = -2x$ | 10. $x^2 = -36y$ |
| 11. $x^2 = 12y$ | 12. $-2y = x^2$ | 13. $x = 4y^2$ | 14. $-x^2 = 48y$ |
| 15. $5x^2 = -15y$ | 16. $-y^2 = 18x$ | 17. $-24x = 3y^2$ | 18. $14x = 6y^2$ |
| 19. $\frac{1}{8}x^2 - y = 0$ | 20. $4x - 11y^2 = 0$ | 21. $5x^2 + 12y = 0$ | 22. $-5x + \frac{1}{3}y^2 = 0$ |

ERROR ANALYSIS Describe and correct the error in graphing the parabola.

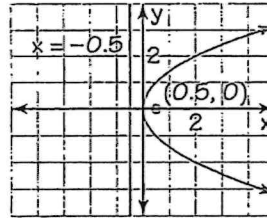
23.

$$-6x + y^2 = 0$$



24.

$$0.5y^2 + x = 0$$



25. **★ MULTIPLE CHOICE** What is the directrix of the parabola $15y + 3x^2 = 0$?

- (A) $x = -5$ (B) $x = -1.25$ (C) $y = -1.25$ (D) $y = 1.25$

WRITING EQUATIONS Write the standard form of the equation of the parabola with the given focus and vertex at $(0, 0)$.

- | | | | |
|------------------------|-------------------------|------------------------|--------------------------|
| 26. $(2, 0)$ | 27. $(-5, 0)$ | 28. $(3, 0)$ | 29. $(0, -4)$ |
| 30. $(0, 8)$ | 31. $(0, -10)$ | 32. $(0, -6)$ | 33. $(-9, 0)$ |
| 34. $(0, \frac{7}{4})$ | 35. $(0, -\frac{3}{8})$ | 36. $(\frac{5}{2}, 0)$ | 37. $(-\frac{9}{16}, 0)$ |

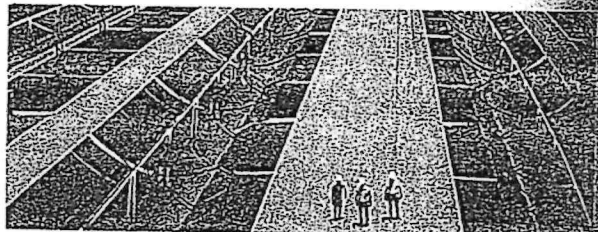
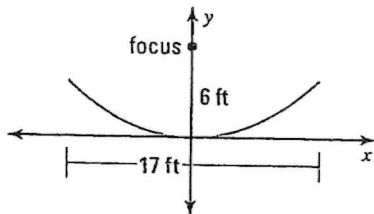
38. ★ **MULTIPLE CHOICE** What is an equation of the parabola with focus at $(-8, 0)$ and vertex at $(0, 0)$?

- (A) $y^2 = -32x$ (B) $y^2 = -0.5x$ (C) $x^2 = -8y$ (D) $x^2 = -32y$

WRITING EQUATIONS Write the standard form of the equation of the parabola with the given directrix and vertex at $(0, 0)$.

39. $x = 3$ 40. $y = -7$ 41. $x = -5$ 42. $y = 12$
 43. $y = -4$ 44. $x = -2$ 45. $y = 6$ 46. $x = 11$
 47. $x = -\frac{3}{2}$ 48. $y = \frac{5}{12}$ 49. $y = -\frac{11}{6}$ 50. $x = -\frac{1}{18}$

55. **SOLAR ENERGY** Solar energy can be concentrated using long troughs that have a parabolic cross section. The collected energy's uses include heating buildings, producing electricity, and producing fresh water from seawater. Write an equation for the cross section of the trough shown. How deep is it?



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57. **MULTI-STEP PROBLEM** The parabolic antenna used by a television station to transmit is 146 inches in diameter. Its focus is 48 inches from the vertex.

- Sketch the antenna twice: once opening upward and once opening left.
- Use your sketches from part (a) to write two equations for the antenna's cross section: one of the form $x^2 = 4py$ and one of the form $y^2 = 4px$.
- How deep is the antenna's dish? Does it matter which equation from part (b) you use to find your answer? *Explain.*

60. **CHALLENGE** The *latus rectum* of a parabola is the line segment that is parallel to the directrix, passes through the focus, and has endpoints that lie on the parabola. Find the length in terms of p of the latus rectum of a parabola with equation $x^2 = 4py$.

