Answers for 9.2

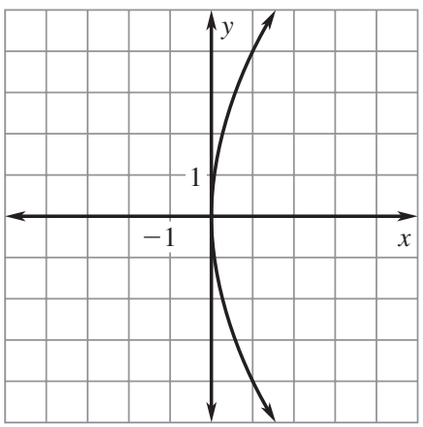
For use with pages 623–625

9.2 Skill Practice

1. focus, directrix

2. *Sample answer:* $x^2 = 4py$ opens up/down depending on the value of p while $y^2 = 4px$ opens left/right depending on the value of p.

3.



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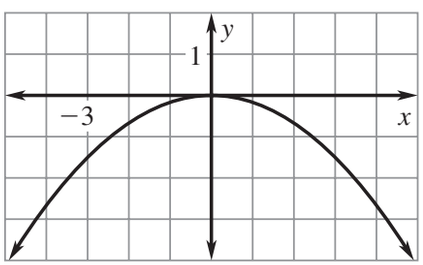

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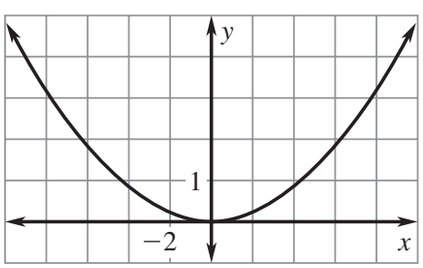

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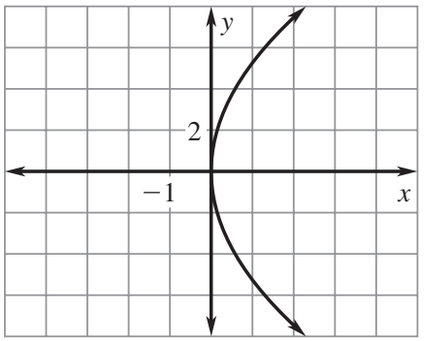

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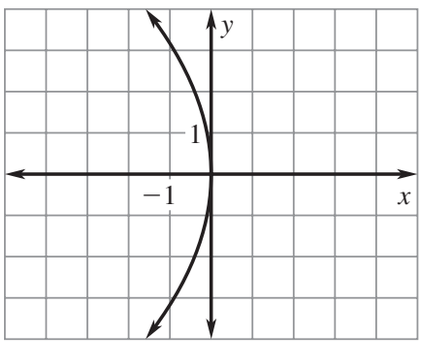

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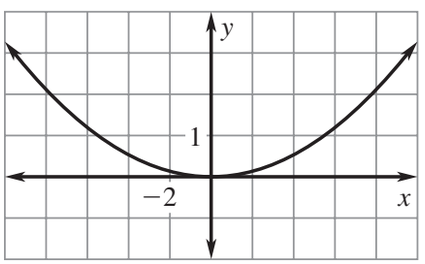

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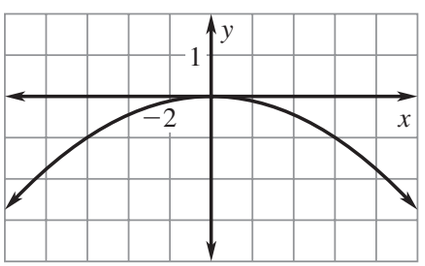

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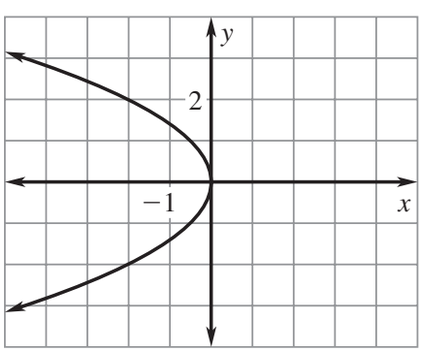
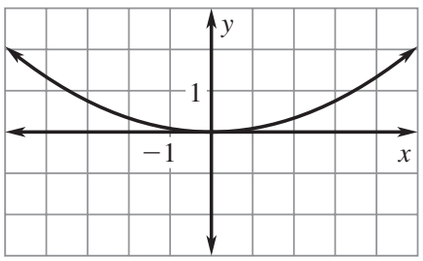


Answers for 9.2 *continued*

For use with pages 623–625

11.



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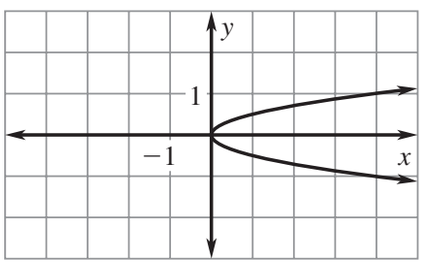

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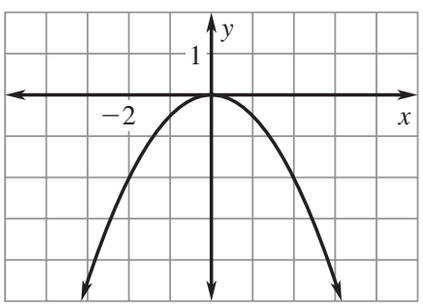

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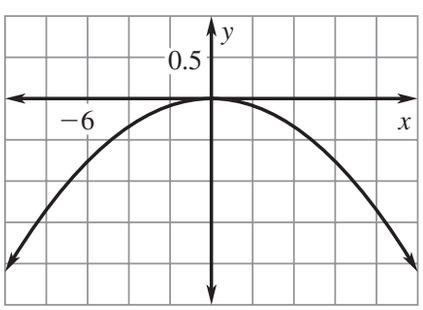

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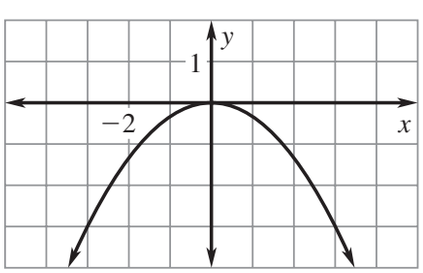

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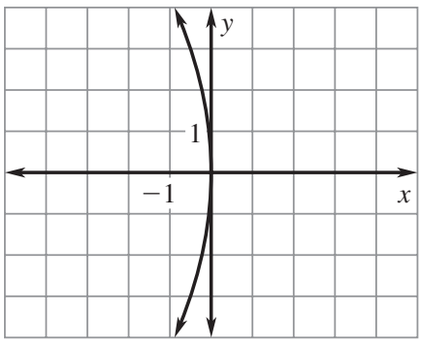

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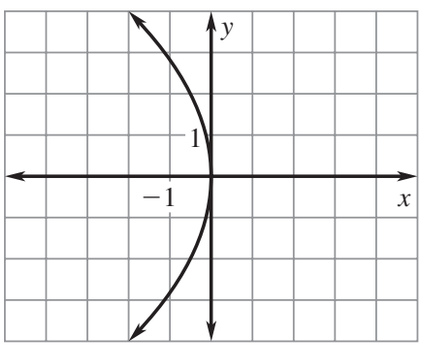

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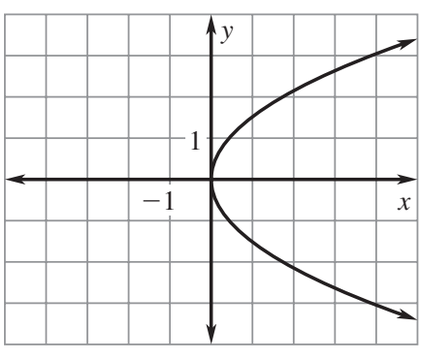

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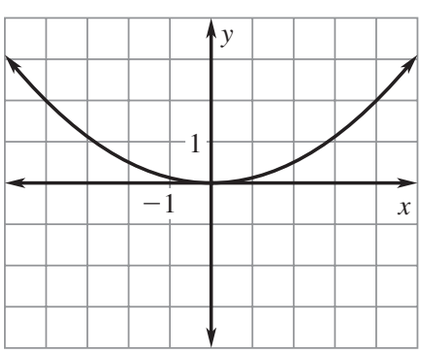

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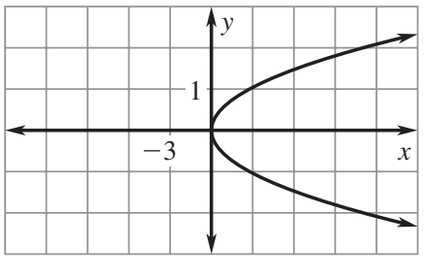

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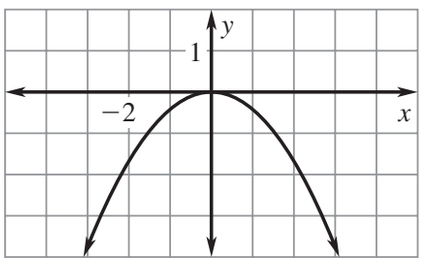

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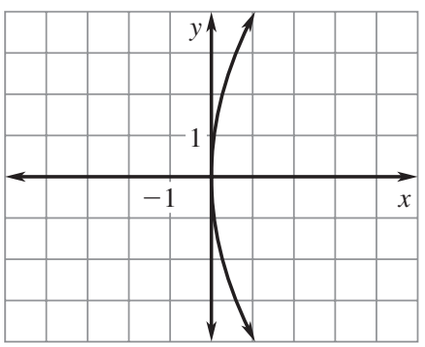
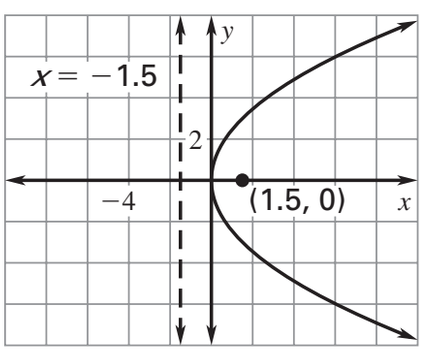
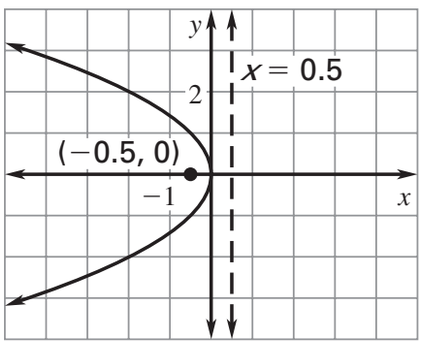


23. The parabola should open to the right rather than up.



24. The parabola should open to the left rather than to the right.



25. D

26. $y^2 = 8x$ **27.** $y^2 = -20x$

28. $y^2 = 12x$ **29.** $x^2 = -16y$

30. $x^2 = 32y$ **31.** $x^2 = -40y$

32. $x^2 = -24y$ **33.** $y^2 = -36x$

34. $x^2 = 7y$ **35.** $x^2 = -\frac{3}{2}y$

36. $y^2 = 10x$ **37.** $y^2 = -\frac{9}{4}x$

38. A

39. $y^2 = -12x$ **40.** $x^2 = 28y$

41. $y^2 = 20x$ **42.** $x^2 = -48y$

43. $x^2 = 16y$ **44.** $y^2 = 8x$

45. $x^2 = -24y$ **46.** $y^2 = -44x$

47. $y^2 = 6x$ **48.** $x^2 = -\frac{5}{3}y$

49. $x^2 = \frac{22}{3}y$ **50.** $y^2 = \frac{2}{9}x$

51. a. The new focus will be located at (0, 1) rather than $\left(0, \frac{1}{4}\right)$. The new directrix will be $y = -1$ rather than $y = -\frac{1}{4}$. The parabola will be wider.

b. The new focus will be located at $\left(-\frac{1}{8}, 0\right)$ rather than $\left(\frac{3}{2}, 0\right)$. The new directrix will be $x = \frac{1}{8}$ rather than $x = -\frac{3}{2}$. The parabola will open left rather than right and will be narrower.

52. *Sample answer:* Both equations describe the family of vertical parabolas with vertices at the origin. Dividing both sides of $x^2 = 4py$ by $4p$ gives $y = \frac{1}{4p}x^2$, which can be written as $y = ax^2$ where $a = \frac{1}{4p}$.

53. The graph gets wider. *Sample answer:* As the value of $|p|$ increases, the focus and directrix (each of which lie $|p|$ units from the vertex) get further away from the vertex and from each other. Since each point on the parabola is equidistant from the focus and the directrix, this makes the parabola wider as $|p|$ increases.

54. *Sample answer:* distance from focus $= \sqrt{(x-0)^2 + (y-p)^2} = \sqrt{x^2 + y^2 - 2py + p^2}$;

distance from directrix $= \sqrt{(x-x)^2 + (y-(-p))^2} = \sqrt{y^2 + 2py + p^2}$;

$\sqrt{x^2 + y^2 - 2py + p^2} = \sqrt{y^2 + 2py + p^2}$;

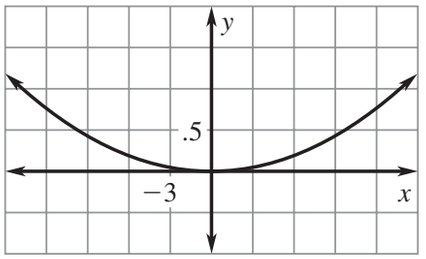
$x^2 + y^2 - 2py + p^2 = y^2 + 2py + p^2$; $x^2 = 4py$

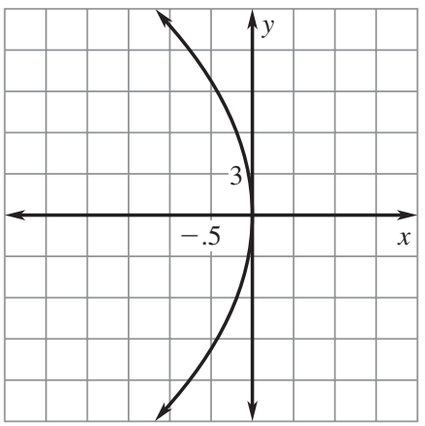
9.2 Problem Solving

55. $x^2 = 24y$; about 3 ft

56. $\frac{4}{3}$ in.

57. a.





b. $x^2 = 192y, y^2 = -192x$

c. About 27.8 in.; no. *Sample answer:* Except for the direction they open, they are identical.

58. $x^2 = 36y$; about 4.3 m

59. a. about 20 in.

b. *Sample answer:* $x^2 = 50y$; choose a value for p such that $4p > 10.5$; about 43.6 in.

c. *Sample answer:* $x^2 = 8y$; choose a value for $4p$ such that $4p < 10.5$; about 17.4 in.

60. $4p$

9.2 Mixed Review

61. $2x^2 - 4x - 2$

62. $-3x^3 + 2x^2 - 3x + 4$

63. $2x^4 - x^3 - 48x^2 + 15x$

64. $2x^3 - 9x^2 + x + 12$

65. $-\frac{4x^5}{3y^2}$

66. $\frac{1}{16}$

67. $\frac{2x^2 - 14x + 5}{(x - 5)(x + 5)(x - 8)}$

68. $\frac{3(x - 5)}{(x + 5)(x - 4)}$

69. $2\sqrt{10}$ **70.** $5\sqrt{5}$

71. $\sqrt{65}$ **72.** $\sqrt{277}$

73. about 7.34 **74.** about 10.0