

5.3

pg. 251 # 6, 10, 12, 18-20, 28, 30, 32, 33, 34, 43, 44, 52

6. vertex $(2, 1)$ axis $x = 2$
shape $-\frac{1}{2}x^2$ $-\frac{1}{2}(2)^2 = -\frac{1}{2}(4) = -2$
over 2 down 2

$$-\frac{1}{2}(4)^2 = -\frac{1}{2}(16) = -8$$

over 4 down 8

18. vertex $(0, 0)$ point $(1, -2)$

$$y = a(x-0)^2 + 0$$
$$-2 = a(1-0)^2 + 0$$
$$-2 = a(1)^2 + 0$$
$$-2 = a \cdot 1$$
$$-2 = a$$

← zeros aren't necessary,
just helping you for #19

$$y = -2(x-0)^2 + 0 \quad y = -2x^2$$

28. $y = x^2 + 2x + 5$ $x = \frac{-b}{2a} = \frac{-2}{2(1)} = \frac{-2}{2} = -1$

↑ 1 isn't necessary, just helping you for #30.

$$y = (-1)^2 + 2(-1) + 5$$
$$y = 1 - 2 + 5$$
$$y = 4$$

vertex $(-1, 4)$ $a = 1$

$$y = 1(x+1)^2 + 4$$

43. $y = a(x-1)^2 + 2$ plug in vertex

$$-5 = a(2-1)^2 + 2$$

plug in point

$$-5 = a(1)^2 + 2$$
$$-5 = a + 2$$
$$-7 = a$$

} solve for a

$$y = -7(x-1)^2 + 2$$
 plug in a & vertex

52. $y = -1(3x-4)^2 + 6$

multiply $(3x-4)(3x-4)$
using a box or PQT
pattern

$$y = -1(9x^2 - 24x + 16) + 6$$

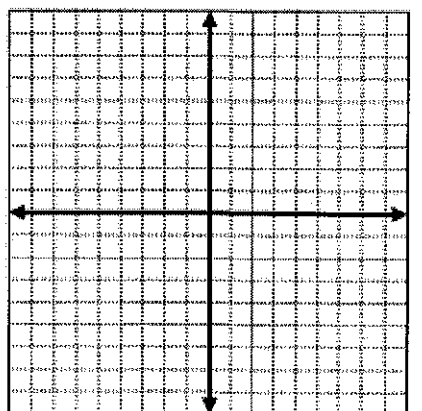
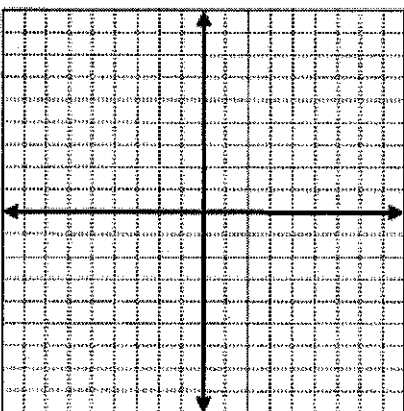
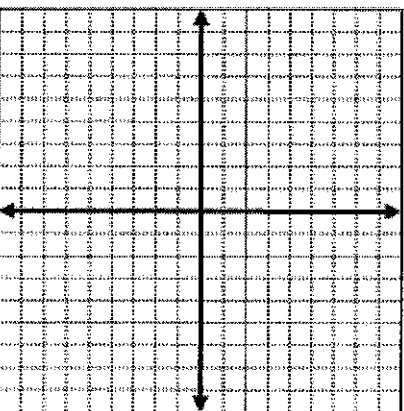
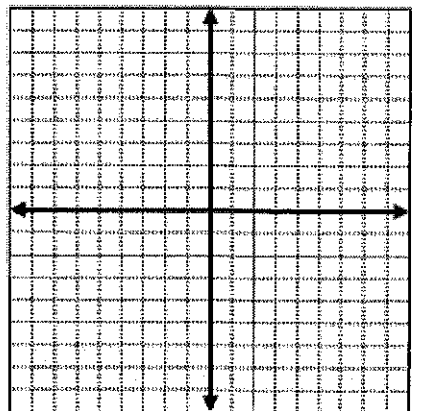
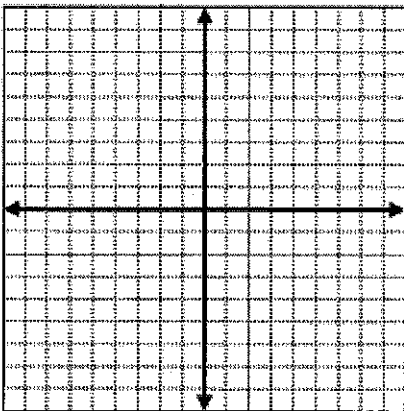
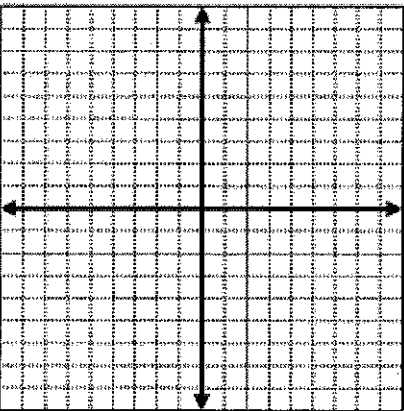
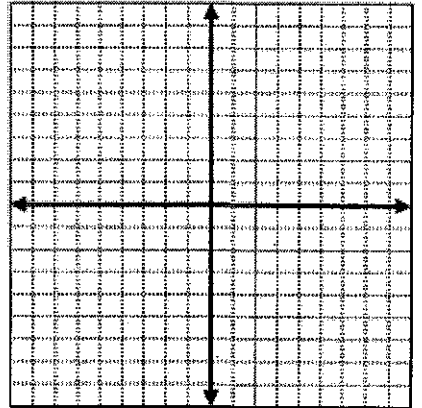
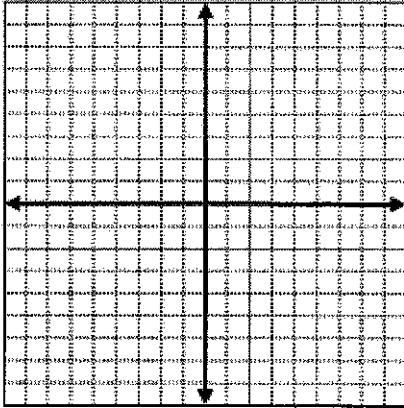
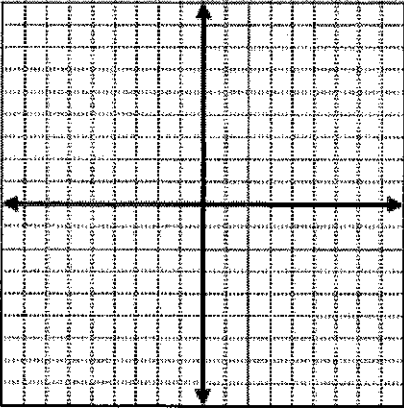
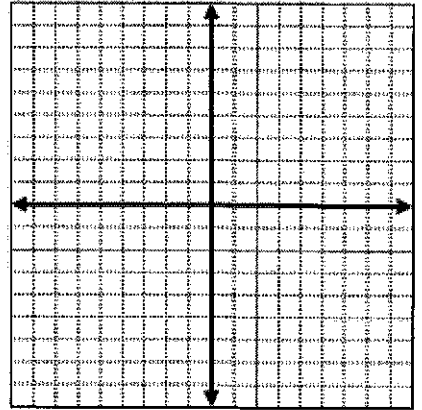
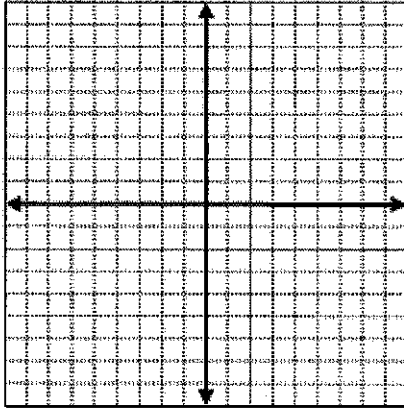
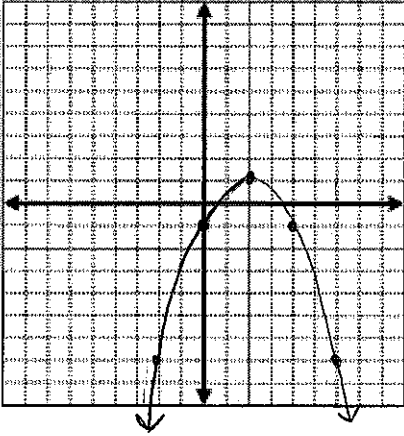
$$y = -9x^2 + 24x - 16 + 6$$

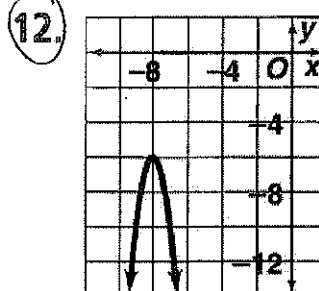
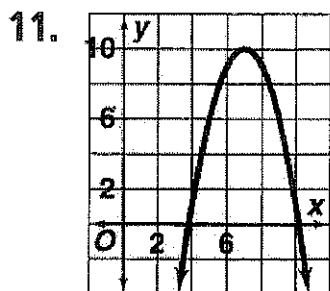
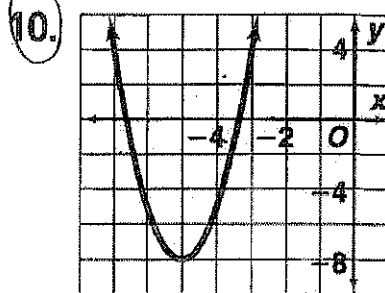
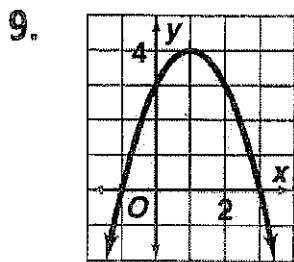
distribute a

$$y = -9x^2 + 24x - 10$$

combine like terms

6.





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

14. $y = -x^2 + 4$

15. $y = -(x - 2)^2$

16. $y = -(x + 2)^2$

17. $y = (x - 2)^2$

18. $y = -2x^2$

19. $y = 6(x + 3)^2 - 2$

20. $y = -(x - 1)^2 + 2$

21. $(-20, 0), -600$

22. $(3.2, 0), 1.024$

23. $(-5.5, 0), 726$

24. $(-1, -1), -0.9965$

25. $(4, -25), -41$

26. $(125, 125), 15,750$

27. $y = (x - 2)^2 + 2$

28. $y = (x + 1)^2 + 4$

29. $y = 6x^2 - 10$

30. $y = -5x^2 + 12$

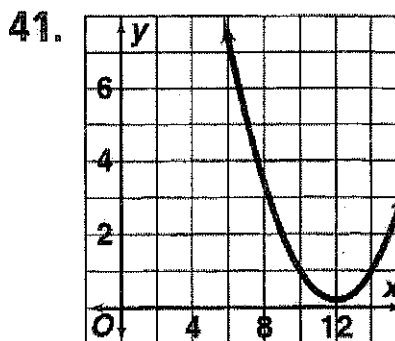
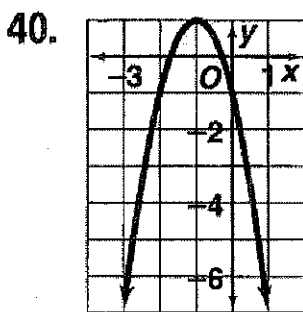
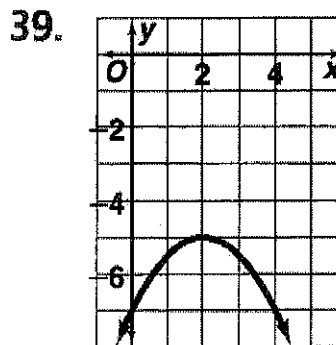
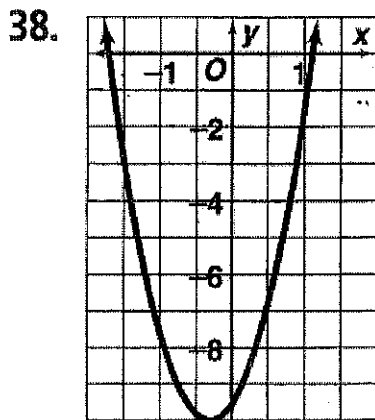
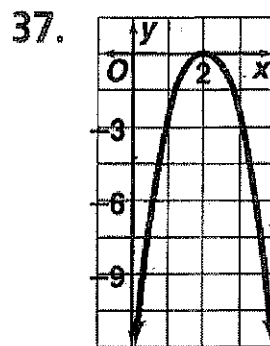
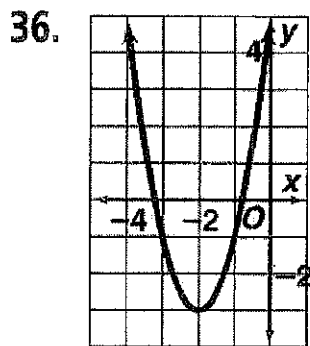
31. $y = 4\left(x + \frac{7}{8}\right)^2 - \frac{49}{16}$

32. $y = 2\left(x + \frac{1}{4}\right)^2 - \frac{1}{8}$

33. $y = 2\left(x - \frac{5}{4}\right)^2 + \frac{71}{8}$

34. $y = -2(x - 2)^2 + 11$

35. $y = \frac{9}{4}\left(x + \frac{2}{3}\right)^2 - 2$



42. a. All nonnegative numbers; a price cannot be negative; it would imply that the bakery pays people to take bread.
 b. \$277.50; \$210.00
 c. \$0.55
 d. \$300.00

43. $y = -7(x - 1)^2 + 2$

44. $y = -\frac{4}{9}(x - 3)^2 + 6$

45. $y = -\frac{1}{2}(x + 3)^2 + 6$

46. $y = \frac{3}{2}(x + 2)^2 + 6$

47. $y = 7(x + 1)^2 - 4$

48. $y = -7x^2 + 5$

49. $y = -10\left(x - \frac{1}{10}\right)^2 - \frac{9}{10}$

50. $y = 8\left(x - \frac{1}{4}\right)^2 - \frac{3}{2}$

51. $y = 25x^2 + 60x + 27$

52. $y = -9x^2 + 24x - 10$

53. $y = 2x^2 + 22x$

54. $y = \frac{1}{2}x^2 - 5x + \frac{35}{2}$

55. $y = -10x^2 - 40x - 40$

56. $y = 16x^2 - 8x + 2$

57. a. first: $x = 4$, second: $x = 2.5$

b. For the first spreadsheet the x_1 -values 3 and 5 are equidistant from 4 and their y_1 -values are both -3 . In the second spreadsheet, the x_2 -values 2 and 3 are equidistant from 2.5 and their y_2 -values are both 2.

c. $y = -4(x - 4)^2 + 1$; $y = 4\left(x - \frac{5}{2}\right)^2 + 1$

58. Answers may vary. Sample: The vertex is (3, 4), so graph that point first. Then substitute 2 for x to find (2, 2) is on the graph. Plot that point and the symmetrically opposite point from the line of symmetry, (4, 2), and sketch the parabola. Plot more and more symmetric pairs if a more accurate curve is desired.

59. yes

60. yes

61. no; $y = -3\left(x + \frac{1}{3}\right)^2 + \frac{4}{3}$

62. yes

63. no; $y = (x + 1)^2 + 7$

64. yes

65. no; $y = -4\left(x - \frac{3}{4}\right)^2 + \frac{21}{4}$

66. yes

67. no; $y = 100\left(x - \frac{1}{5}\right)^2 + 6$

68. Any real numbers a and k such that $a + k = 1$ will work. However, if $a = 0$ and $k = 1$, the function will be linear rather than quadratic.

69. $a = 3, k = -1$

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