Name_____ Class _____ Date_____

Extra Practice

Chapter 4

Lessons 4-1 and 4-2

Graph each system.

1. $y = 3x^2$

2. $y = (x + 3)^2 + 1$

3. $y = 2x^2 + 4$

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

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

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

Identify the vertex, axis of symmetry, minimum or maximum value, and domain and range of each function.

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

8. $f(x) = (x + 1)^2 + 2$

9. $y = -\frac{1}{2}(x - 4)^2 - 10$

10. $f(x) = x^2 - 4x + 5$

11. $f(x) = -2x^2 + 4x - 3$

12. $y = x^2 + 5x - 14$

13. A ball is dropped from the top of a building. The distance in meters above the ground y of the ball after t seconds can be modeled by the equation $y = -9.8t^2 + 100$.

a. What is the y-intercept of the equation?

b. Describe the meaning of the y-intercept of the graph of the equation.

Name_____ Class _____ Date_____

Extra Practice (continued)

Chapter 4

14. Martin has 120 feet of fencing to enclose two rectangular play

areas for children. He plans to enclose a rectangular area and
then divide it into two equal sections, as shown in the figure.

a. Find the dimensions of the largest total area Martin can enclose.

b. Find the area of each of the small play areas.

15. Marnie throws a softball straight up into the air. The ball leaves her hand when it is exactly 5 ft from the ground. The height h of the ball, in feet, can be written as a function of time t, in seconds, as $h = -16t^2 + 40t + 5$.

a. What is the maximum height the ball reaches?

b. Marnie catches the ball 5 ft from the ground. How long was the ball in the air?

Lesson 4-3

Find an equation in standard form of the parabola passing through the given points.

16. (0, 3), (1, 2), (2, 3)

17. (–3, –4), (0, –4), (1, 0)

18. (–1, 0), (0, 3), (1, 2)

19. (–4, 3), (–2, –1), (2, 3)

20. (0, 0), (1,–3), (2, 2)

21. (–3, 0), (0, –3), (3, 0)

22. The table shows the relation between the speed of a car and its stopping distance.

Speed (mi/h)	35	45	50	60
Stopping Distance (ft)	96	140	165	221

a. Use a quadratic function to model the data.

b. Predict the stopping distance for a car traveling at 65 mi/h.

Lesson 4-4

Factor each expression.

23. $x^2 + 3x - 54$

24. $x^2 + 10x + 24$

25. $x^2 - 36$

26. $x^2 - 9x - 36$

27. $x^2 - 15x + 56$

28. $25x^2 + 70x + 49$

29. $7x^2 - 20x - 3$

30. $5x^2 + 23x - 10$

31. $\frac{1}{4}x^2 - 4$

32. $x^2 - 6x - 16$

33. $4x^2 + 12x + 40$

34. $4x^2 - 6x + 9$

Name_____ Class _____ Date_____

Extra Practice (continued)

Chapter 4

Lesson 4-5

Solve each equation by factoring, by taking square roots, or by graphing. When necessary, round your answer to the nearest hundredth.

35. $x^2 + 4x - 1 = 0$ **36.** $4x^2 - 100 = 0$ **37.** $x^2 = -2x + 1$

38. $x^2 - 9 = 0$ **39.** $2x^2 + 4x = 70$ **40.** $x^2 - 30 = 10$

41. $x^2 + 4x = 0$ **42.** $x^2 + 3x + 2 = 0$ **43.** $x^2 = 8x = -16$

44. Hal's sister is 5 years older than Hal. The product of their ages is 456. How old are Hal and his sister?

45. A toy rocket is fired upward from the ground. The relation between its height h, in feet, and the time t from launch, in seconds, can be described by the equation $h = -16t^2 + 64t$. How long does the rocket stay more than 48 feet above the ground?

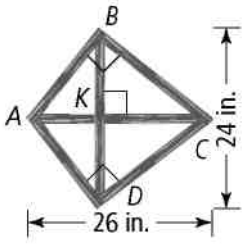
46. The expression $P(x) = 2500x - 2x^2$ describes the profit of a company that customizes bulldozers when it customizes x bulldozers in a month.

a. How many bulldozers per month must the company customize to make the maximum possible profit? What is the maximum profit?

b. Describe a reasonable domain and range for the function $P(x)$.

c. For what number of bulldozers per month is the profit at least \$750,000?

47. Flor is designing a kite with two perpendicular crosspieces that are 26 inches and 24 inches long, as shown in the figure. How long should Ak be so that $AB \perp BC$ and $AD \perp DC$?



48. The lengths of the sides of a right triangle are x, $x + 4$, and $x + 8$ inches. What is the value of x? What is the length of the hypotenuse of the triangle?

47.

Lessons 4-6 and 4-7

Solve each equation by completing the square or using the Quadratic Formula.

49. $x^2 + 5x + 8 = 4$ **50.** $2x^2 - 5x + 1 = 0$ **51.** $x^2 - 7x = 0$

52. $x^2 + 4x + 4 = 0$ **53.** $x^2 - 7 = 0$ **54.** $x^2 + 8x - 17 = 0$

Name_____ Class _____ Date_____

Extra Practice (continued)

Chapter 4

Evaluate the discriminant of each equation. Tell how many real solutions each equation has.

55. $x^2 + 4x = 17$ **56.** $2x^2 + x = -1$ **57.** $x^2 - 4x + 5 = 0$

58. $2x^2 + 5x = 0$ **59.** $x^2 - 19 = 1$ **60.** $3x^2 = 8x - 4$

61. $-2x^2 + 1 = 7x$ **62.** $4x^2 + 4x = -1$ **63.** $x^2 + 16 = 0$

64. The height y of a parabolic arch is given by $y = -\frac{1}{16}x^2 + 40$, where x is the horizontal distance from the center of the base of the arch. All distances are in feet.

a. What is the highest point on the arch?

b. How wide is the arch at the base to the nearest tenth of a foot?

65. An archer's arrow follows a parabolic path. The path of the arrow can be described by the equation $y = -0.005x^2 + 2x + 5$.

a. Describe the meaning of the y-intercept of the graph of the equation.

b. What is the horizontal distance the arrow travels before it hits the ground? Round your answer to the nearest foot.

Lesson 4-8

Simplify each number by using the imaginary number *i*.

66. $\sqrt{-9}$ **67.** $\sqrt{-36}$ **68.** $\sqrt{-80}$

69. $\sqrt{-289}$ **70.** $\sqrt{-175}$ **71.** $\sqrt{-117}$

Simplify each expression.

72. $(3 - i) + (5 - 2i)$ **73.** $(4 + 2i)(1 - i)$ **74.** $(4 + 2i) - (3 + 5i)$

75. $(8 - 3i)(6 + 9i)$ **76.** $(2 + 5i) - (-6 + i)$ **77.** $(-2 - 3i)(7 - i)$

Solve each equation. Check your answers.

78. $x^2 + 16 = 0$ **79.** $3x^2 = x - 9$ **80.** $x^2 + 10 = 4x - 2$

Lesson 4-9

Solve each system.

81. $\begin{cases} y = x^2 - 11x + 24 \\ y = x - 3 \end{cases}$ **82.** $\begin{cases} y = x^2 + 2x - 8 \\ y = x + 4 \end{cases}$ **83.** $\begin{cases} y = 2x^2 + 9x - 5 \\ y = x + 5 \end{cases}$

84. $\begin{cases} y = x^2 - 3x - 7 \\ y = -x^2 - x + 5 \end{cases}$ **85.** $\begin{cases} y = 2x^2 + x + 4 \\ y = -x^2 - x + 9 \end{cases}$ **86.** $\begin{cases} y = x^2 - 2x - 1 \\ y = \frac{3}{4}x^2 + x - 6 \end{cases}$