Chapter 10 Review Exercises

Fill in each blank with a word that correctly completes the sentence.

1. If the _____ of two numbers is 0, then one of the numbers must be 0. **(10.1)**

2. In the quadratic formula, the expression in the radical, $b^2 + 4ac$, is called the _____ . **(10.2)**

3. The _____ **Theorem** states that, in every right triangle,

$leg^2 + leg^2 = hypotenuse^2$ (also known as $a^2 + b^2 = c^2$). **(10.3)**

4. In a rational expression, restrictions are placed on the variable for any value that makes the _____ equal to 0 (zero). **(10.4)**

Section 10.1

Use the Zero Product Principle to solve each equation.

5. $(x + 3)(x - 5) = 0$ **6.** $(3w - 2)(4w + 8) = 0$ **7.** $0 = 2x(7x + 4)$

Use the Zero Product Principle to solve each equation.

8. $x^2 - 49 = 0$ **9.** $2x^2 + 12x = 0$ **10.** $p^2 + 9p + 18 = 0$

11. $0 = x^2 - 10x - 24$ **12.** $4x^2 - 12x + 9 = 0$ **13.** $8w^2 + 18w - 5 = 0$

Use the Zero Product Principle to solve each equation.

14. $x^2 + 4x = 45$ **15.** $y^2 + 25 = 10y$ **16.** $w^2 = 81$

17. $-m^2 + 5 = 16m + 33$ **18.** $3x = 2x^2 - 9$

19. $(w + 5)(w - 11) = -63$ **20.** $-28 = (2m + 3)(m - 6)$

Section 10.3

For each set of numbers, find the discriminant of the related quadratic formula and decide how many solutions the associated quadratic equation will have.

21. $a = 1$, $b = 8$, $c = 7$

22. $a = 1$, $b = -6$, $c = 9$

23. $a = 3$, $b = -5$, $c = 6$

24. $a = 3$, $b = 9$, $c = 5$

Solve each quadratic equation using the quadratic formula.

25. $x^2 + 5x + 6 = 0$

26. $x^2 - 6x + 6 = 0$

27. $2x^2 + 8x + 3 = 0$

28. $3x^2 + 6x + 5 = 0$

29. $w^2 - 6w - 1 = 0$

30. $0 = y^2 - 6y + 9$

31. $0 = 5x^2 + 10x + 6$

32. $4x^2 + 12x + 9 = 0$

Section 10.3

Use the area of a rectangle formula to solve. Write a sentence to answer each question.

33. A rectangular roof has an area of 45 square yards. The length is 1 yard more than twice the width. Find the dimensions of the roof.

34. A rectangular picture window has an area of 30 square feet. The length is two feet less than four times the width. Find the dimensions of the picture window.

Use the area of a triangle formula to solve: $\text{Area} = \frac{1}{2} \cdot \text{leg}_1 \cdot \text{leg}_2$. *Write a sentence to answer each question.*

35. A right triangle has an area of 15 square meters. The longer leg is 1 meter more than the shorter leg. Find the lengths of the legs of this triangle.

36. A public vegetable garden is divided up in different shapes for those who wish to grow vegetables there. Mitch's piece is in the shape of a right triangle and has an area of 20 square feet. The longer leg is 2 feet more than twice the shorter leg. What are the lengths of the two legs of that triangle?

Use the Pythagorean Theorem to solve. Write a sentence to answer each question.

37. A right triangle's hypotenuse is 3 feet less than twice the shorter leg, and the longer leg is 3 foot more than the shorter leg. Find the lengths of all three sides of this triangle.

38. A right triangle's shorter leg is 7 inches less than the longer leg, and the hypotenuse is 1 inch more than the longer leg. Find the dimensions of the right triangle.

Nolan was standing on a 96-foot high cliff and threw a baseball upward with an initial velocity of 80 feet per second. The baseball's height above the ground, in feet, after t seconds, is given by $Height = -16x^2 + 80x + 96$. *Based on this height formula, answer the following questions:*

39. How high above the ground was the baseball after

a) $\frac{1}{2}$ second? **b)** 1 second? **c)** 2 seconds?

40. In how many seconds did the baseball hit the ground? (Hint: The GCF of each term is 16.)

Section 10.4

For each fraction, identify the restriction placed on the variable.

41. $\frac{2x+5}{x^2-4}$

42. $\frac{x^2+5x+3}{x^2-x-30}$

Solve each equation. Verify your answers to show they are solutions.

43. $1 - \frac{3}{x} = \frac{10}{x^2}$

44. $\frac{1}{2} + \frac{1}{x} = \frac{1}{6} + \frac{1}{3x}$

45. $\frac{2}{x+2} + \frac{3}{x-2} = 1$

46. $\frac{3}{x^2+2x} + \frac{4}{x+2} = 1$

47. $x + \frac{8}{x-4} = \frac{x+4}{x-4} + 1$

48. $1 + \frac{3}{x-2} = \frac{6}{x^2-2x}$

Section 10.5

49. Miles and Pete are on the crew of a large sailing vessel. Pete can tie 18 knots in 30 minutes. Together, Pete and Miles can tie 21 knots in just 20 minutes. How long would it take Miles to tie 9 knots by himself?

50. During the winter, Jim's Wood Farm provides fire wood to the many residents in his mountain top village. Jim's crew can fill an entire bin in 2 days, but the villagers can buy enough wood to empty the bin in 3 days. If the bin starts empty, and Jim's crew works to fill it while the residents continue to buy it, in how many days will it take Jim's crew to fill the bin again.

51. It takes Randall 6 hours to plow the cornfield with his new tractor. It takes his son Ke-Shawn 12 hours in the old tractor. Working together, how long would it take Randall and Ke-Shawn to plow the cornfield?

52. Executive Pool Service has an account with all of the Hilton Hotels in the area to clean their pools. One crew member, Mike, can clean a typical Hilton pool in 90 minutes. When working together, Mike and Jake can clean a Hilton pool in 30 minutes. How long would it take Jake to clean a Hilton pool by himself?

53. It takes the left side hose twice as long to fill a pool as it does the right side hose. When working together, the hoses can fill the pool in 4 hours. How long would it take each hose to fill the pool by itself?

54. Mario and Luigi own an ice cream parlor. Whoever stays late to close the store must also clean it completely. Sometime Mario closes the store, sometimes it's Luigi, and sometimes they close the store together. It takes Mario three times as long as Luigi to clean the whole store by himself. When they clean it together, they can do it in 30 minutes. How long does it take each to clean the store by himself?