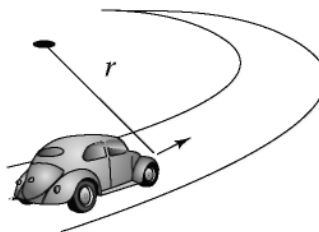# Extra Practice

Chapter 8

Lesson 8-1

Suppose that x and y vary inversely. Write a function that models each inverse variation, describe the graph of the function, and find y when $x = 10$.

1. $x = 3$ when $y = 2$ **2.** $x = 4$ when $y = -1$ **3.** $x = 5$ when $y = 8$

4. $x = -6$ when $y = -2$ **5.** $x = -8$ when $y = 3$ **6.** $x = 10$ when $y = 15$

7. Sound intensity is inversely proportional to the square of the distance from the source—the farther from the source you are, the less intense the sound. Suppose the sound intensity is 30 watts per square meter (W/m^2) at 8 meters. What is the sound intensity at 4 meters?

8. The maximum load a cylindrical column can support varies directly as the fourth power of the diameter and inversely as the square of the height. A column that is 2 ft in diameter and 10 ft high can support up to 6 tons. If a column is 1 ft in diameter and 12 ft high, what is the maximum load it can support?

9. The force required to keep a car from skidding in a turn varies jointly with the mass of the car m, the square of its speed v, and the curvature k of the turn. The curvature is the reciprocal of the radius of the turn, $k = \dfrac{1}{r}$. Suppose it takes 2800 lb of force to keep an 1800-lb car from skidding at 45 mi/h on a curve with radius 425 ft. What force is needed to keep the car from skidding at 50 mi/h on a curve with a radius of 440 ft?

Lesson 8-2

Sketch the asymptotes and the graph of each function. Identify the domain and the range.

10. $y = \dfrac{8}{x} - 1$ **11.** $y = \dfrac{1}{x-2} + 1$ **12.** $y = \dfrac{2}{x+1}$

Extra Practice (continued)

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Write an equation for the translation of $y = \dfrac{4}{x}$ **that has the given asymptotes.**

13. $x = 0$ and $y = 3$ **14.** $x = 1$ and $y = -1$ **15.** $x = -2$ and $y = -4$

16. How do the graphs of $y = \dfrac{1}{x}$ and $y = \dfrac{-5}{x}$ compare?

17. The current I in amperes that exist in a circuit is inversely proportional to the resistance R in ohms of the circuit. For a circuit powered by a 9-volt battery, $I = \dfrac{9}{R}$. Find the current in a circuit that has 0.125 ohms of resistance.

Lesson 8-3

Find points of discontinuity, the domain, and *x*- and *y*-intercepts of each rational function. Determine if the discontinuities are *removable* or *non-removable*.

18. $y = \dfrac{-3x}{x - 4}$ **19.** $y = \dfrac{3x^2 + 2x}{x}$ **20.** $y = \dfrac{x^2 - 16}{x^2 + 4}$

21. $y = \dfrac{(x + 2)(x - 1)}{(x + 2)^2 (x - 1)}$ **22.** $y = \dfrac{4}{x - 6}$ **23.** $y = \dfrac{9x}{3x^3 - 6x}$

24. $y = \dfrac{x^2 + 7x + 12}{x + 4}$ **25.** $y = \dfrac{x - 7}{x - 7}$ **26.** $y = \dfrac{x^2 - 3x + 2}{x - 1}$

Sketch the graph of each rational equation.

27. $y = \dfrac{x + 1}{x - 2}$ **28.** $y = \dfrac{x - 3}{(x + 1)^2}$ **29.** $y = \dfrac{3x}{2x + 1}$

Extra Practice (continued)

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30. $y = \dfrac{x-4}{x^2}$

31. $y = \dfrac{2x+1}{2x-1}$

32. $y = \dfrac{x}{x+3}$

33. During a season of baseball, you score a hit 10 times during your first 40 at bats for a batting average of 25%, or 0.25. How many more consecutive hits would you need to raise your batting average to 0.375?

34. In her first 16 basketball games, Kimberlyn made 65.8% of her free throws. In the next game, she made 7 of 9 free throws. Let x be the number of free throws Kimberlyn tried in the first 16 games. Write a rational function that represents the percent of free throws made after 17 games.

35. The monthly cost $C(p)$ of removing p percent of pollutants from waste byproduct in manufacturing can be modeled by the function $C(p) = \dfrac{1500p}{100 - p}$. A manufacturer decides to spend \$28,500 per month for removal of pollutants. What percent of the pollutant can the manufacturer expect to remove from the waste?

Lesson 8-4

Simplify. State any restrictions on the variables.

36. $\dfrac{5x^2 y}{10xy^4}$

37. $\dfrac{4d^2 + 8d}{2d}$

38. $\dfrac{x^2 + 9x + 18}{x+6}$

39. $\dfrac{x^2 + 3x + 2}{x-1} \cdot \dfrac{1-x}{x+2}$

40. $\dfrac{x^2 - 2x - 8}{x+3} \div \dfrac{x-4}{x+3}$

41. $\dfrac{2x^2 + 5x - 3}{x^2 - 4x} \cdot \dfrac{2x^3 - 8x^2}{x^2 + 6x + 9}$

42. $\dfrac{3x+1}{x^2 - 6x - 6} \div \dfrac{6x^2 + 11x + 3}{x^2 + 4x + 4}$

43. $\dfrac{3x^4 - x^3 - 2x^2}{6x^2 - 2x - 4}$

Lesson 8-5

Find the least common multiple of each pair of polynomials.

44. $2(4x - 1)$ and $4(x - 1)$

45. $3(x + 2)(x - 3)$ and $5(x + 2)(x + 3)$

46. $2x^3y(x - 1)(x + 4)$ and $x^2(x - 2)$

47. $x^2 + 3x - 10$ and $x^2 + 7x + 10$

Extra Practice (continued)

Chapter 8

Simplify each sum or difference. State any restrictions on the variables.

48. $\dfrac{6x+1}{x+2}+\dfrac{2x-5}{2x+4}$

49. $\dfrac{8}{x^2-25}+\dfrac{9}{x-5}$

50. $\dfrac{x-3}{x^2+3x}+\dfrac{7}{x+3}$

51. $\dfrac{3x}{x^2+5x+6}-\dfrac{2x}{x^2+8x+16}$

52. $\dfrac{2}{x^2-1}-3$

53. $\dfrac{2x}{x-5}-\dfrac{x}{x+7}$

54. The total capacitance of two capacitors connected in series can be found using the
equation $\dfrac{1}{C_T}=\dfrac{1}{C_1}+\dfrac{1}{C_2}$ where the capacitance is measured in farads.

   a. Solve the equation for C_T.

   b. What is the total capacitance when a 2-farad capacitor and an 8-farad
   capacitor are put in series?

Lesson 8-6

Solve each equation. Check each solution.

55. $\dfrac{x}{4}=\dfrac{x+1}{3}$

56. $\dfrac{2}{x^2-1}=\dfrac{4}{x+1}$

57. $\dfrac{3x}{5}+\dfrac{4}{x}=\dfrac{4x+1}{5}$

58. $\dfrac{3x}{x-2}=4+\dfrac{x}{5}$

59. $x+\dfrac{x}{4}-\dfrac{x}{5}=21$

60. $\dfrac{3}{x+4}+\dfrac{5}{4}=\dfrac{18}{x+4}$

61. Michael rows downstream on a river. He then returns to the starting point.
Michael traveled a total distance of 16 mi in 6.25 h. Michael's average rowing
speed in still water is 4 mi/h. Assume the speed of the river current is constant.
What is the speed of the river current?

62. It would take an apprentice house painter 1.5 h longer than his supervisor to
paint an apartment. If they work together, they can complete the job in 4 h.
About how long would it take the apprentice to complete the job working
alone? Round your answer to the nearest tenth of an hour.

63. A master roofer can cover a garage in 1 h less than her new assistant. If they
work together, they can complete the job in 7.75 h. How long would it take
the assistant to complete the job working alone?