

# Chapter 8 Study Guide

Simplify each expression.

$$1. \frac{9a^2b^3}{27a^4b^4c}$$

$$3. \frac{3x+6}{x^2-4}$$

$$5. \frac{x^2+x-6}{x^2-6x-27}$$

$$2. \frac{10y^2+15y}{35y^2-5y}$$

$$4. \frac{24m^3n^2}{-18m^5n^4}$$

$$6. \frac{x-1}{x^2-1}$$

Multiply each expression.

$$7. \frac{a+y}{6} \cdot \frac{4}{a^2-y^2}$$

$$9. \frac{-2u^3y}{15xz^5} \cdot \frac{25x^3}{14u^2y^2}$$

$$11. \frac{(m-3)^2}{m^2-6m+9} \cdot \frac{m^3-9m}{m^2-9}$$

$$8. \frac{n^5}{n-6} \cdot \frac{n^2-6n}{n^8}$$

$$10. \frac{a^3w^2}{w^5y^2} \cdot \frac{y^8}{a^2w^4}$$

$$12. \frac{-7xy}{3x} \cdot \frac{4y^2}{2y}$$

Divide each expression.

$$13. \frac{a^5y^3}{wy^7} \div \frac{a^3w^2}{w^5y^2}$$

$$15. \frac{3x+6}{x^2-9} \div \frac{6x^2+12x}{4x+12}$$

$$17. \frac{2m-1}{m^2-3m-10} \div \frac{4m^2-1}{4m+8}$$

$$14. \frac{x+y}{6} \div \frac{x^2-y^2}{3}$$

$$16. \frac{a^2-9}{a^2+5a+6} \div \frac{2a-6}{5a+10}$$

$$18. \frac{6xy^4}{25z^3} \div \frac{18xz^2}{5y}$$

Simplify the Complex Fractions.

$$19. \frac{\frac{2x+1}{x}}{\frac{4-x}{x}}$$

$$21. \frac{\frac{a^2bc^3}{x^2y^2}}{\frac{ab^2}{c^4x^2y}}$$

$$23. \frac{\frac{x-4}{x^2+6x+9}}{\frac{x^2-2x-8}{x+3}}$$

$$20. \frac{\frac{x^2-9}{4}}{\frac{x-3}{8}}$$

$$22. \frac{\frac{x^3y^2z}{a^2b^2}}{\frac{a^3x^2y}{b^2}}$$

$$24. \frac{\frac{x^2-x-2}{x+1}}{x+3}$$

Find the LCM of each set of polynomials.

25.  $14ab^2, 42bc^3, 18a^2c$

26.  $8cdf^3, 28c^2f, 35d^4f^2$

27.  $x^2 + 3x, x^2 - 2x - 15$

Add or subtract each expression.

28.  $\frac{-7xy}{3x} + \frac{4y^2}{2y}$

31.  $\frac{3}{x+2} + \frac{4x+5}{3x+6}$

34.  $\frac{16}{x^2-16} + \frac{2}{x+4}$

29.  $\frac{2}{x-3} - \frac{1}{x-1}$

32.  $\frac{3x+3}{x^2+2x+1} + \frac{x-1}{x^2-1}$

35.  $\frac{y-5}{y^2-3y-10} + \frac{y}{y^2+y-2}$

30.  $\frac{4a}{3bc} - \frac{15b}{5ac}$

33.  $\frac{5}{2x-12} - \frac{20}{x^2-4x-12}$

36.  $\frac{5}{12x^4y} - \frac{1}{5x^2y^3}$

Simplify the complex fractions.

37.  $\frac{\frac{c-d}{d-c}}{\frac{d}{c}+2}$

38.  $\frac{1-\frac{y}{x}}{\frac{1}{y}+\frac{1}{x}}$

39.  $\frac{4+\frac{2}{x}}{3-\frac{2}{x}}$

Solve each equation.

40.  $\frac{9}{10} + \frac{2}{x+1} = \frac{2}{5}$

43.  $\frac{4t-3}{5} - \frac{4-2t}{3} = 1$

47.  $\frac{12p+19}{p^2+7p+12} - \frac{3}{p+3} = \frac{5}{p+4}$

41.  $\frac{2y}{3} - \frac{y+3}{6} = 2$

44.  $\frac{4}{x-1} = \frac{x+1}{12}$

48.  $\frac{2f}{f^2-4} + \frac{1}{f-2} = \frac{2}{f+2}$

42.  $\frac{3m+2}{5m} + \frac{2m-1}{2m} = 4$

45.  $\frac{2x+1}{3} - \frac{x-5}{4} = \frac{1}{2}$

46.  $\frac{x}{x-2} + \frac{4}{x-2} = 10$

**Graph each function. State the domain and range, and identify the asymptotes.**

$$49. f(x) = \frac{-3}{x+7} - 1$$

$$51. f(x) = \frac{2}{x-6}$$

$$53. f(x) = \frac{8}{x-2}$$

$$50. f(x) = \frac{-4}{x+2}$$

$$52. f(x) = \frac{9}{x+3} - 6$$

$$54. f(x) = \frac{-6}{x+4} - 2$$

**Graph each function. Identify the asymptotes and the zero(s).**

$$55. f(x) = \frac{x^4-2}{x^2-1}$$

$$57. f(x) = \frac{4x^3}{2x^2+x-1}$$

$$59. f(x) = \frac{x^4-2x^2+1}{x^3+2}$$

$$56. f(x) = \frac{x^3+64}{16x-24}$$

$$58. f(x) = \frac{4x^3}{2x^2+x-1}$$

$$60. f(x) = \frac{x^2+4x-12}{x-2}$$

**Solve each variation function problem.**

61. If y varies directly as x and y=15 when x=-5, find y when x=7.

62. If r varies directly as t and r=-20 when t=4, find r when t=-6.

63. If y varies directly as x and y=-15 when x=5, find y when x=3.

64. Suppose y varies jointly as x and z. Find y when x=9 and z=2, if y=20 when z=3 and x=5.

65. Suppose r varies jointly as v and t. Find r when v=2 and t=8, if r=70 when v=10 and t=4.

66. Suppose  $y$  varies jointly as  $x$  and  $z$ . Find  $y$  when  $x=10$  and  $z=5$ , if  $y=12$  when  $z=8$  and  $x=3$ .
67. If  $a$  varies inversely as  $b$  and  $a=28$  when  $b=-2$ , find  $a$  when  $b=-10$ .
68. If  $x$  varies inversely as  $y$  and  $x=24$  when  $y=4$ , find  $x$  when  $y=12$ .
69. If  $r$  varies inversely as  $t$  and  $r=-6$  when  $t=2$ , find  $r$  when  $t=-7$ .
70. Suppose  $f$  varies directly as  $g$ , and  $f$  varies inversely as  $h$ . Find  $g$  when  $f=18$  and  $h=-3$ , if  $g=24$  when  $h=2$  and  $f=6$ .
71. Suppose  $p$  varies directly as  $r$  and  $p$  varies inversely as  $t$ . Find  $t$  when  $r=10$  and  $p=-5$ , if  $t=20$  when  $p=4$  and  $r=2$ .
72. Suppose  $f$  varies directly as  $g$ , and  $f$  varies inversely as  $h$ . Find  $g$  when  $f=6$  and  $h=-5$ , if  $g=18$  when  $h=3$  and  $f=5$ .

**Solve the following real-world problems.**

73. Jimmy adds a 65% fruit juice solution to 15 milliliters of a drink that is 10% fruit juice. How much of the 65% fruit juice solution must be added to create a fruit punch that is 35% fruit juice?
74. The speed of the wind is 20 miles per hour. If it takes a plane 7 hours to fly 2,368 miles round trip, determine the plane's speed in still air.
75. It took Anthony and Travis 6 hours to rake the leaves together last year. The previous year it took Travis 10 hours to do it alone. How long will it take Anthony if he rakes them by himself this year?