8 CHAPTER TEST

The variables x and y vary inversely. Use the given values to write an equation relating x and y. Then find y when $x = 4$.

1. $x = 5, y = 2$

2. $x = -2, y = 8$

3. $x = \dfrac{3}{2}, y = 10$

4. $x = 3, y = 6$

5. $x = -4, y = \dfrac{7}{2}$

6. $x = \dfrac{3}{4}, y = \dfrac{5}{8}$

Graph the function. State the domain and range.

7. $y = \dfrac{2}{x + 5} - 3$

8. $y = \dfrac{-1}{x - 4} - 1$

9. $f(x) = \dfrac{6 - x}{2x + 1}$

Graph the function.

10. $y = \dfrac{4}{x^2 + 2}$

11. $y = \dfrac{x^2 - 4}{x^2 + 8x + 15}$

12. $g(x) = \dfrac{x^2 + 3}{2x - 1}$

Find the least common multiple of the polynomials.

13. $(x - 3)(x + 5)$ and $x(x + 5)$

14. $4x^2(x - 2)$ and $8x(x + 2)$

15. $x^2 - 4x$ and $x^2 - 2x - 8$

16. $2x + 6$ and $x^3 + 10x^2 + 21x$

Perform the indicated operation and simplify.

17. $\dfrac{3x^2 y}{4x^3 y^5} \div \dfrac{6y^2}{2xy^3}$

18. $\dfrac{x^2 - 3x - 4}{x^2 - 3x - 18} \cdot \dfrac{x - 6}{x + 1}$

19. $\dfrac{x^2 - 8x + 15}{x^2 + 12x + 32} \cdot \dfrac{x + 4}{x^2 - 25}$

20. $\dfrac{x^2 - 11x + 28}{x^2 + 5x + 4} \div (x^2 - 16)$

21. $\dfrac{3x}{x + 5} - \dfrac{4x + 1}{x + 5}$

22. $\dfrac{4}{x - 3} + \dfrac{2}{x + 6}$

23. $\dfrac{3x}{x^2 + x - 12} - \dfrac{6}{x + 4}$

24. $\dfrac{4}{x + 5} + \dfrac{2x}{x^2 - 25}$

Solve the equation. Check for extraneous solutions.

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

26. $\dfrac{1}{x + 6} + \dfrac{x + 1}{x} = \dfrac{13}{x + 6}$

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

28. SOUND INTENSITY The intensity I of a sound varies inversely with the square of the distance r from the source of the sound. Write an equation relating I, r, and a constant a.

29. CABLE TV You have subscribed to a cable television service. The cable company charges you a one-time installation fee of \$30 and a monthly fee of \$50. Write and graph a model that gives the average cost per month as a function of the number of months you have subscribed to the service. After how many months will the average cost be \$56?

30. WEB HOSTING You are building a new website for your school. A company that hosts websites offers a dedicated server for a \$50 setup fee plus a monthly fee of \$99. How many months would you need to use this service in order for your average monthly cost to fall to \$100?