

Cumulative Review

For use after Chapter 7

Graph the numbers on a number line. (Lesson 1.1)

1. $-\frac{2}{3}, 4, \frac{3}{4}, 3, -2$

2. $-\frac{1}{4}, -2, \sqrt{3}, \frac{1}{4}, 0$

3. **Washing Windows** It takes you 2 minutes to wash a window, and it takes a friend 3 minutes to wash a window. How long does it take the two of you to wash 25 windows if you work together? (Lesson 1.3)

Solve the equation for y . Then find the value of y for the given value of x .
(Lesson 1.4)

4. $3x + y = 8; x = 2$

5. $2x - y = 12; x = 3$

6. $2x - 3y = 14; x = 10$

Find the slope of the line passing through the given points. Then tell whether the line rises, falls, is horizontal, or is vertical. (Lesson 2.2)

7. $(-1, 2), (-2, 3)$

8. $(1, 1), (1, -1)$

Graph the equation. Label any intercepts. (Lesson 2.3)

9. $2x - 3y = 4$

10. $-3x - 2y = 6$

Write an equation of the line that has the given slope and y -intercept.
(Lesson 2.4)

11. $m = 2, b = 3$

12. $m = 3, b = -2$

13. $m = -1, b = 0$

Solve the system using any algebraic method. (Lessons 3.2, 3.4)

14. $2x - 3y = -1$
 $-x + 2y = 1$

15. $2x + 2y = 0$
 $x - 3y = 8$

16. $x - y + z = 2$
 $2x - y + 3z = 3$
 $3x + 3y - 6z = 3$

Use Cramer's rule to solve the linear system. (Lesson 3.7)

17. $3x - 4y = 2$
 $x + 3y = 5$

18. $x + 2y + z = 5$
 $-x + 3y + 2z = 2$
 $2x - 2y - 3z = -4$

Graph the function. Label the vertex and axis of symmetry. (Lesson 4.1)

19. $y = 3x^2$

20. $y = 2x^2 - 3$

Factor the expression. (Lesson 4.4)

21. $2u^2 - 72$

22. $9s^2 - 4$

23. $3q^2 - 24q$

Solve the equation by completing the square. (Lesson 4.7)

24. $3x^2 + 2x = 10$

25. $2x^2 - 3 = x$

Graph the polynomial function. (Lesson 5.2)

26. $f(x) = x^3 - 4$

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

CHAPTER
7
Cumulative Review *continued*
For use after Chapter 7
Factor the polynomial completely using any method. (Lesson 5.4)

28. $j^3 + 7j^2 + 7j - 15$

29. $8b^3 - 1000$

30. $a^6b^3 - 64$

Determine the possible number of positive real zeros, negative real zeros, and imaginary zeros for the function. (Lesson 5.7)

31. $f(x) = x^3 - 3x^2 + 5x - 15$

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

33. $f(x) = x^5 + x^4 - 16x - 16$

Evaluate the expression using a calculator. Round the result to two decimal places when appropriate. (Lesson 6.1)

34. $\sqrt{4342}$

35. $\sqrt[5]{-81}$

Let $f(x) = 2x + 1$ and $g(x) = 3x^2$. Perform the indicated operation. (Lesson 6.3)

36. $f(g(x))$

37. $g(f(x))$

Graph the function. State the domain and range. (Lesson 6.5)

38. $f(x) = 2\sqrt{x} - 5$

39. $f(x) = -(x + 1)^{1/2} + 3$

40. $g(x) = -2\sqrt[3]{x + 2} + 1$

Graph the function. State the domain and range. (Lessons 7.1, 7.2)

41. $f(x) = 2 \cdot 3^{x+1}$

42. $g(x) = 4^{x-1} + 1$

43. $h(x) = -3 \cdot 2^{x+2} - 4$

44. $f(x) = 2\left(\frac{1}{3}\right)^{x+1}$

45. $g(x) = -3\left(\frac{2}{5}\right)^x - 4$

46. $h(x) = 3(0.75)^{x-1} + 1$

Simplify the expression. (Lesson 7.3)

47. $e^3 \cdot e^5$

48. $e^x \cdot e^{2x}$

49. $\frac{2e^3}{4e^2}$

Tell whether the function is an example of exponential growth or exponential decay. (Lesson 7.3)

50. $f(x) = \frac{2}{3}e^{2x}$

51. $g(x) = \frac{1}{5}e^{-3x}$

52. Finance You deposit \$2500 in an account that pays 5% annual interest compounded continuously. What is the balance after 10 years? (Lesson 7.3)

Evaluate the logarithm without using a calculator. (Lesson 7.4)

53. $\log_2 8$

54. $\log_3 27$

55. $\log_5 625$

Expand the expression. (Lesson 7.5)

56. $\log_3 5x^2$

57. $\log_4 16x^3$

Condense the expression. (Lesson 7.5)

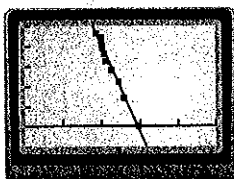
58. $\log_5 16 + \log_5 x^2$

59. $\log_8 24 + \log_8 12x - \log_8 x^2$

Review and Project, continued

City, State	Population, P	Rank, R
New York, NY	8,086,000	1
Los Angeles, CA	3,820,000	2
Chicago, IL	2,869,000	3
Houston, TX	2,010,000	4
Philadelphia, PA	1,479,000	5
Phoenix, AZ	1,388,000	6
San Diego, CA	1,267,000	7
San Antonio, TX	1,215,000	8
Dallas, TX	1,208,000	9
Detroit, MI	911,000	10

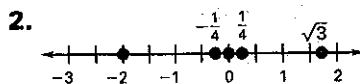
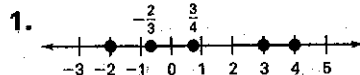
2. Sample answer: $y = -1.085x + 17.200$
(or $\ln R = -1.085 \ln P + 17.200$).



3. Sample answer: yes 4. Sample answer:
 $R = 29,516,921P^{-1.085}$ 5. Sample answer:
The population of Indianapolis, Indiana is about
783,000. The model predicts a rank of 11.894;
actual rank is 12. So, it matches very well.

6. Answers will vary.

Cumulative Review

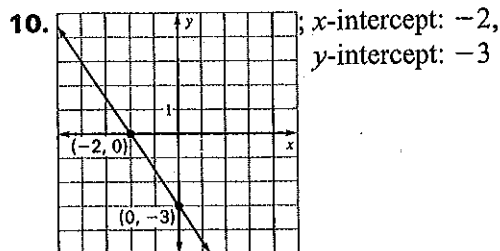
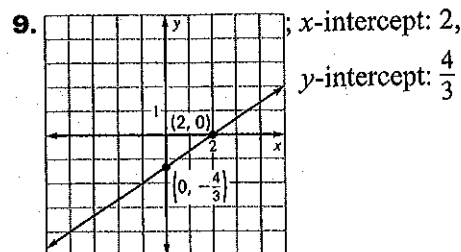


3. 30 min 4. $y = -3x + 8$; 2

5. $y = 2x - 12$; -6

6. $y = \frac{1}{3}(2x - 14)$; 2 7. -1; falls

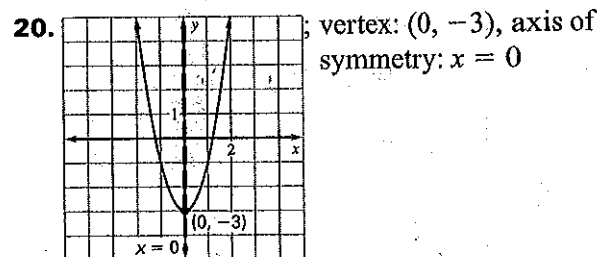
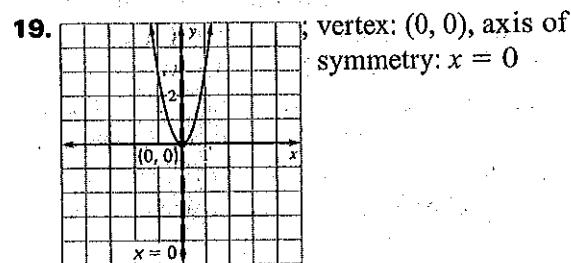
8. undefined; is vertical



11. $y = 2x + 3$ 12. $y = 3x - 2$ 13. $y = -x$

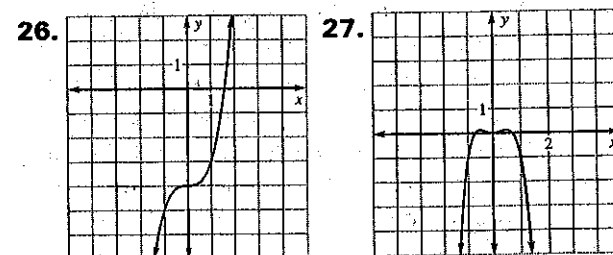
14. (1, 1) 15. (2, -2) 16. $(\frac{7}{5}, -\frac{4}{5}, -\frac{1}{5})$

17. (2, 1) 18. (3, -1, 4)



21. $2(u + 6)(u - 6)$ 22. $(3s + 2)(3s - 2)$

23. $3q(q - 8)$ 24. $\frac{-1 \pm \sqrt{31}}{3}$ 25. $-1, \frac{3}{2}$



28. $(j + 3)(j + 5)(j - 1)$

29. $8(b - 5)(b^2 + 5b + 25)$

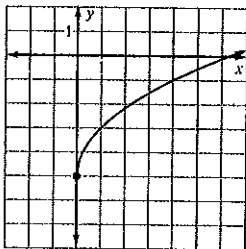
30. $(a^2b - 4)[(a^2b)^2 + 4a^2b + 16]$

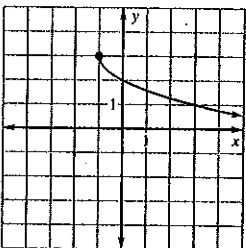
Review and Project, continued

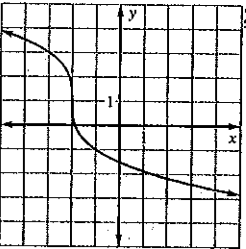
31. positive zeros: 1 or 3, negative zeros: 0, imaginary zeros: 0 or 2 **32.** positive zeros: 0 or 2, negative zeros: 0 or 2, imaginary zeros: 0, 2 or 4

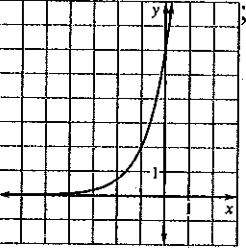
33. positive zeros: 1, negative zeros: 0 or 2, imaginary zeros: 2 or 4 **34.** 65.89 **35.** -2.41

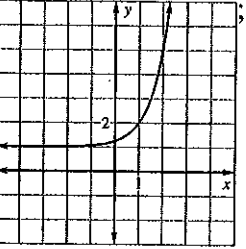
36. $6x^2 + 1$ **37.** $12x^2 + 12x + 3$

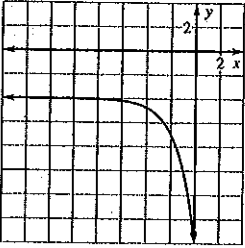
38. ; domain: $x \geq 0$, range: $y \geq -5$

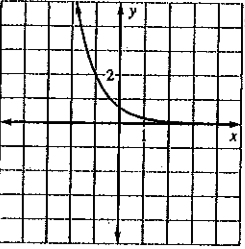
39. ; domain: $x \geq -1$, range: $y \leq 3$

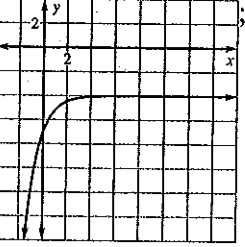
40. ; domain and range: all real numbers

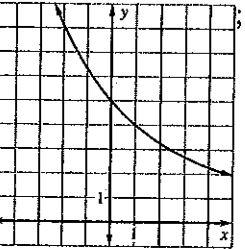
41. ; domain: all real numbers, range: $y \geq 0$

42. ; domain: all real numbers, range: $y \geq 1$

43. ; domain: all real numbers, range: $y \leq -4$

44. ; domain: all real numbers, range: $y \geq 0$

45. ; domain: all real numbers, range: $y \leq -4$

46. ; domain: all real numbers, range: $y \geq 1$

47. e^8 **48.** e^{3x} **49.** $\frac{e}{2}$ **50.** exponential growth

51. exponential decay **52.** \$4121.80 **53.** 3

54. 3 **55.** 4 **56.** $\log_3 5 + 2 \log_3 x$

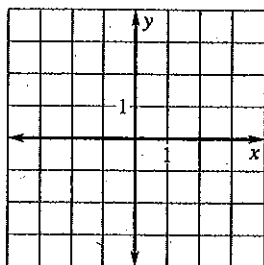
57. $2 + 3 \log_4 x$ **58.** $\log_5 16x^2$ **59.** $\log_8 \frac{228}{x}$

CHAPTER
7**Chapter Test B**

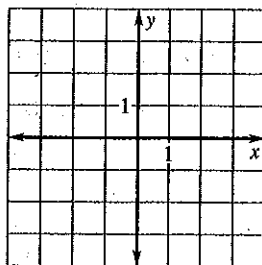
For use after Chapter 7

Graph the function. State the domain and range.

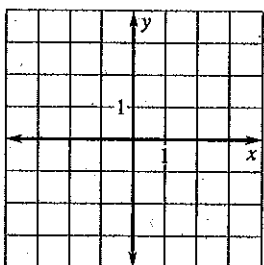
1. $y = \frac{1}{2} \cdot 2^x$



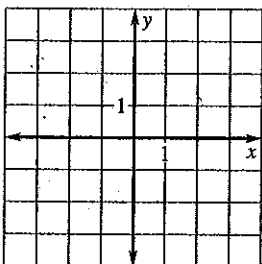
2. $y = -2 \cdot 3^{x+1} + 2$

**Graph the function. State the domain and range.**

3. $y = 2\left(\frac{2}{3}\right)^x$



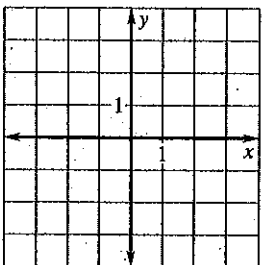
4. $y = \frac{1}{2}\left(\frac{3}{4}\right)^{x+1} - 2$



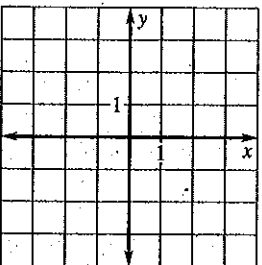
5. On your birthday you receive a PDA for \$300. The value of the PDA decreases by 20% each year. What will its value be 4 years from now?

Graph the function. State the domain and range.

6. $y = 0.4e^{-2x}$



7. $y = -3e^{0.5x}$

**Find the inverse of the function.**

8. $y = \log_4(x + 3)$

9. $y = 2e^{x-2}$

Answers

1. See left.

2. See left.

3. See left.

4. See left.

5. _____

6. See left.

7. See left.

8. _____

9. _____

CHAPTER
7**Chapter Test B** *continued*

For use after Chapter 7

Simplify the expression.

10. $(2e^{-2x}) \cdot e^{2x}$

11. $\sqrt[3]{16e^{12}}$

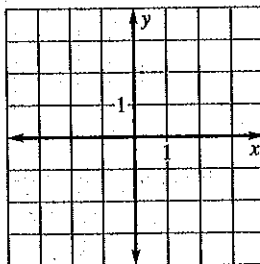
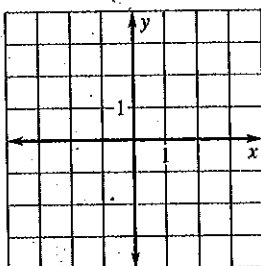
12. $\log_5 625^x$

13. $4^{\log_2 8x}$

Graph the function. State the domain and range.

14. $y = \log_7 x$

15. $y = \log_3 (x + 2) - 2$

**Expand the expression.**

16. $\log_{1/2} \sqrt{xy}$

17. $\ln xy$

Condense the expression.

18. $\ln 4xy^2 - 2 \ln x^2y$

19. $\log_5 \sqrt[3]{x^2y} + \log_5 \sqrt[3]{xy^5}$

Solve the equation by equating exponents.

20. $4^{(2x+4)} = 16^{(3x-6)}$

21. $(0.25)^{x+8} = (0.5)^{x^2+1}$

Solve the equation.

22. $\log_2 (x^2 + 2x) = 3$

23. $\log_3 x + \log_3 (x - 6) = 3$

24. You deposit \$300 into a savings account that pays 5% annual interest. If the account compounds daily, how long will it take for the account to reach \$3000? If necessary, round your answer to two decimal places.

25. Write an exponential function whose graph passes through the points (2, 16) and (5, 128).

26. Write a power function whose graph passes through the points (2, 5) and (6, 9).

Answers

10. _____

11. _____

12. _____

13. _____

14. See left.

15. See left.

16. _____

17. _____

18. _____

19. _____

20. _____

21. _____

22. _____

23. _____

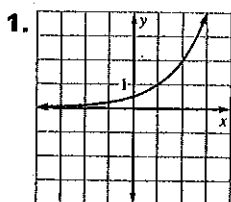
24. _____

25. _____

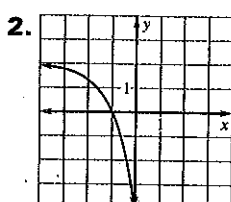
26. _____

Chapter 7, continued

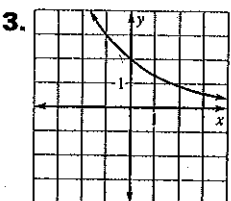
Chapter Test B



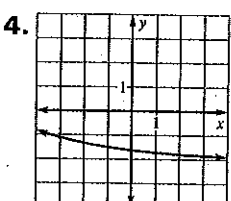
domain: all real numbers
range: $y > 0$



domain: all real numbers
range: $y < 2$

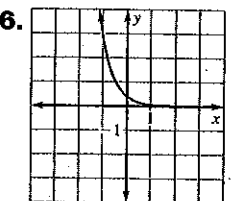


domain: all real numbers
range: $y > 0$

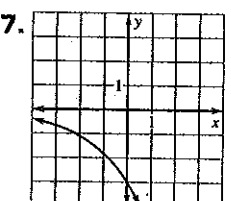


domain: all real numbers
range: $y > -2$

5. \$122.88



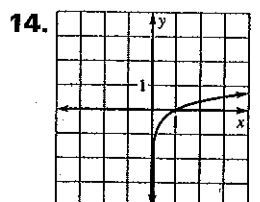
domain: all real numbers
range: $y > 0$



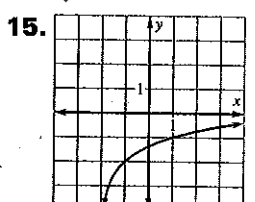
domain: all real numbers
range: $y < 0$

8. $4^x - 3$ 9. $\ln \frac{x}{2} + 2$ 10. 2 11. $2 \cdot \sqrt[3]{2}e^4$

12. $4x$ 13. $64x^2$



domain: $x > 0$
range: all real numbers



domain: $x > -2$
range: all real numbers

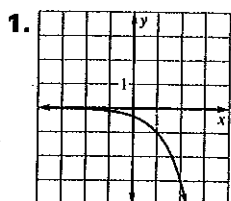
16. $\frac{1}{2} \log_{1/2} x + \frac{1}{2} \log_{1/2} y$ 17. $\ln x + \ln y$

18. $\ln \frac{4}{x^3}$ 19. $\log_5(xy^2)$ 20. 4 21. 5, -3

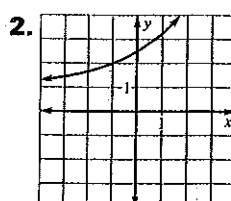
22. 2, -4 23. 9 24. 46.05 years

25. $y = 4 \cdot 2^x$ 26. $y = 3.45 \cdot x^{0.54}$

Chapter Test C

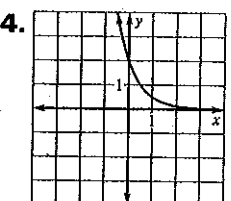


domain: all real numbers
range: $y < 0$

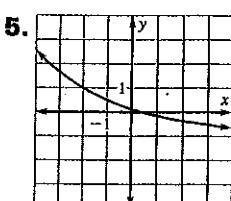


domain: all real numbers
range: $y > 1$

3. \$4709.18

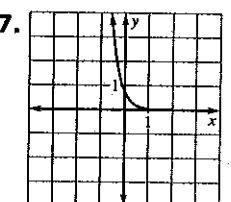


domain: all real numbers
range: $y > 0$

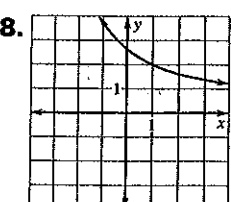


domain: all real numbers
range: $y > -1$

6. \$3684.75



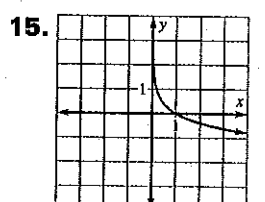
domain: all real numbers
range: $y > 0$



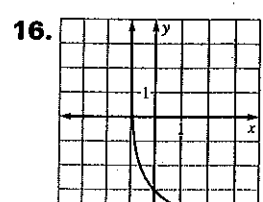
domain: all real numbers
range: $y > 1$

9. e^{2x} 10. 2 11. $-2x$ 12. $8x$ 13. $6^x + 3$

14. $e^{(x-2)} + 2$



domain: $x > 0$
range: $y > -1$



domain: $x > -1$
range: all real numbers

17. $\ln 4 + \ln y^2$ 18. $2 + \log_4 x^8 + \log_4 y^6$

19. 2 20. $\ln y^2$ 21. 5 22. 10 23. 1 24. 4

25. $y = 5 \cdot 2^x$ 26. $y = 1.75x^{1.12}$

Standardized Test

1. C 2. B 3. D 4. A 5. A 6. D 7. B 8. C

9. D 10. B 11. A 12. D 13. B 14. 4

