CHAPTER 1 REVIEW EXERCISES

1.1 *In Exercises 1–3, write each English phrase as an algebraic expression. Let x represent the number.*

1. Ten less than twice a number
2. Four more than the product of six and a number
3. The quotient of nine and a number, increased by half of the number

In Exercises 4–6, evaluate each algebraic expression for the given value or values of the variable.

4. $x^2 - 7x + 4$, for $x = 10$
5. $6 + 2(x - 8)^3$, for $x = 11$
6. $x^4 - (x - y)$, for $x = 2$ and $y = 1$

In Exercises 7–8, use the roster method to list the elements in each set.

7. $\{x|x$ is a natural number less than $3\}$
8. $\{x|x$ is an integer greater than -4 and less than $2\}$

In Exercises 9–11, determine whether each statement is true or false.

9. $0 \in \{x|x$ is a natural number$\}$
10. $-2 \in \{x|x$ is a rational number$\}$
11. $\frac{1}{3} \notin \{x|x$ is an irrational number$\}$

In Exercises 12–14, write out the meaning of each inequality. Then determine whether the inequality is true or false.

12. $-5 < 2$
13. $-7 \geq -3$
14. $-7 \leq -7$
15. You are riding along an expressway traveling x miles per hour. The formula
$$S = 0.015x^2 + x + 10$$
models the recommended safe distance, S, in feet, between

1.2 *In Exercises 16–18, find each absolute value.*

16. $|-9.7|$
17. $|5.003|$
18. $|0|$

In Exercises 19–30, perform the indicated operation.

19. $-2.4 + (-5.2)$
20. $-6.8 + 2.4$
21. $-7 - (-20)$
22. $(-3)(-20)$
23. $-\frac{3}{5} - \left(-\frac{1}{2}\right)$
24. $\left(\frac{2}{7}\right)\left(-\frac{3}{10}\right)$
25. $4(-3)(-2)(-10)$
26. $(-2)^4$
27. -2^5
28. $-\frac{2}{3} \div \frac{8}{5}$
29. $\frac{-35}{-5}$
30. $\frac{54.6}{-6}$
31. Find $-x$ if $x = -7$.

In Exercises 32–38, simplify each expression.

32. $-11 - [-17 + (-3)]$
33. $\left(-\frac{1}{2}\right)^3 \cdot 2^4$
34. $-3[4 - (6 - 8)]$
35. $8^2 - 36 \div 3^2 \cdot 4 - (-7)$
36. $\frac{(-2)^4 + (-3)^2}{2^2 - (-21)}$
37. $\frac{(7 - 9)^3 - (-4)^2}{2 + 2(8) \div 4}$
38. $4 - (3 - 8)^2 + 3 \div 6 \cdot 4^2$

In Exercises 39–43, simplify each algebraic expression.

39. $5(2x - 3) + 7x$
40. $5x + 7x^2 - 4x + 2x^2$
41. $3(4y - 5) - (7y + 2)$
42. $8 - 2[3 - (5x - 1)]$
43. $6(2x - 3) - 5(3x - 2)$

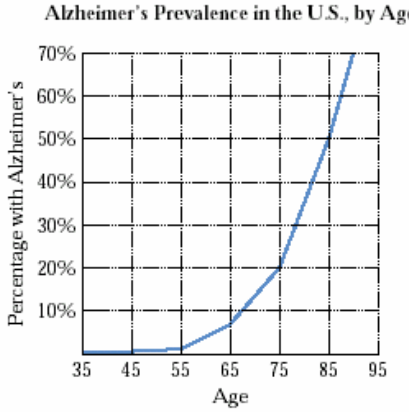
1.3 *In Exercises 44–46, plot the given point in a rectangular coordinate system.*

44. $(-1, 3)$
45. $(2, -5)$
46. $(0, -6)$

In Exercises 47–50, graph each equation. Let $x = -3, -2, -1, 0, 1, 2,$ and 3.

47. $y = 2x - 2$
48. $y = x^2 - 3$
49. $y = x$
50. $y = |x| - 2$
51. What does a $[-20, 40, 10]$ by $[-5, 5, 1]$ viewing rectangle mean? Draw axes with tick marks and label the tick marks to illustrate this viewing rectangle.

The caseload of Alzheimer's disease in the United States is expected to explode as baby boomers head into their later years. The graph shows the percentage of Americans with the disease, by age. Use the graph to solve Exercises 53–54.



Source: Centers for Disease Control

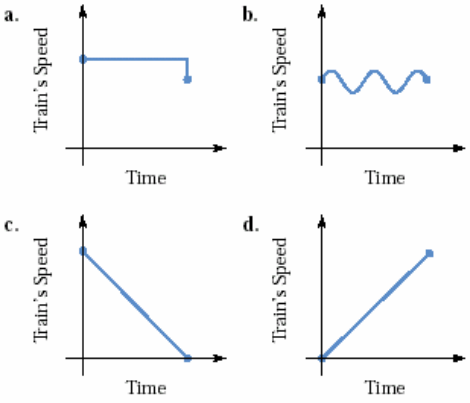
(In Exercises 52–54, be sure to refer to the graph on the previous page.)

52. What percentage of Americans who are 75 have Alzheimer's disease?

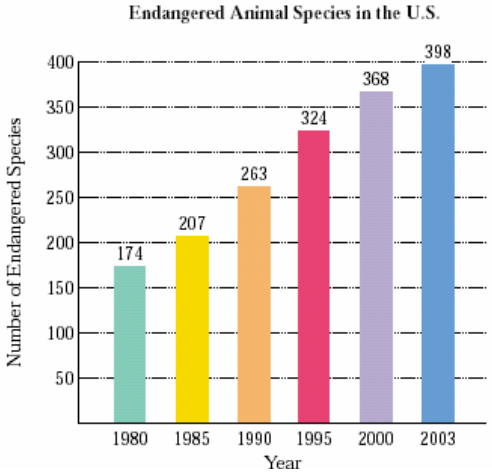
53. What age represents 50% prevalence of Alzheimer's disease?

54. Describe the trend shown by the graph.

55. Select the graph that best illustrates the following description: A train pulls into a station and lets off its passengers.



72. The bar graph shows the number of endangered animal species in the United States for six selected years. The data can be modeled by the formula $E = 10x + 167$, in which E represents the number of endangered species x years after 1980. If the trend indicated by this model continues, in which year will there be 437 endangered animal species in the United States?



1.4 *In Exercises 56–61, solve and check each linear equation.*

56. $2x - 5 = 7$

57. $5x + 20 = 3x$

58. $7(x - 4) = x + 2$

59. $1 - 2(6 - x) = 3x + 2$

60. $2(x - 4) + 3(x + 5) = 2x - 2$

61. $2x - 4(5x + 1) = 3x + 17$

In Exercises 62–66, solve each equation.

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

63. $\frac{x}{2} - \frac{1}{10} = \frac{x}{5} + \frac{1}{2}$

64. $\frac{2x}{3} = 6 - \frac{x}{4}$

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

66. $\frac{3x + 1}{3} - \frac{13}{2} = \frac{1 - x}{4}$

In Exercises 67–71, solve each equation. Then state whether the equation is an identity, a conditional equation, or an inconsistent equation.

67. $7x + 5 = 5(x + 3) + 2x$

68. $7x + 13 = 4x - 10 + 3x + 23$

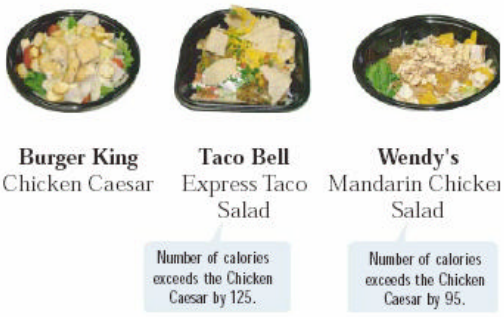
69. $7x + 13 = 3x - 10 + 2x + 23$

70. $4(x - 3) + 5 = x + 5(x - 2)$

71. $(2x - 3)2 - 3(x + 1) = (x - 2)4 - 3(x + 5)$

1.5 *In Exercises 73–79, use the five-step strategy for solving word problems.*

73. The fast-food chains may be touting their "new and improved" salads, but how do they measure up in terms of calories?



Source: Newsweek

Combined, the three salads contain 1705 calories. Determine the number of calories in each salad.

74. One angle of a triangle measures 10° more than the second angle. The measure of the third angle is twice the sum of the measures of the first two angles. Determine the measure of each angle.

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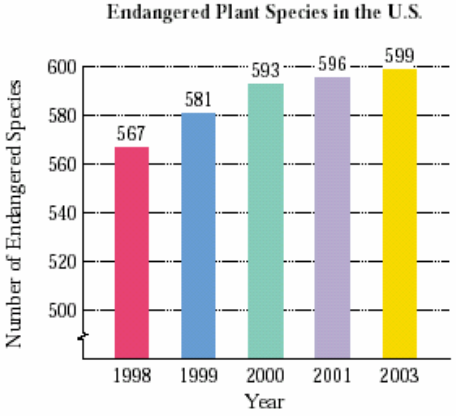
71. $(2x - 3)2 - 3(x + 1) = (x - 2)4 - 3(x + 5)$

Combined, the three salads contain 1705 calories. Determine the number of calories in each salad.

74. One angle of a triangle measures 10° more than the second angle. The measure of the third angle is twice the sum of the measures of the first two angles. Determine the measure of each angle.

75. The bar graph shows the number of endangered plant species in the United States from 1998 through 2003. In 1998, there were 567 endangered species. For the period shown, the number of endangered plants increased at an average rate of 6.4 species per year. If this trend continues, in which year will there be 663 endangered plant species in the United States?



Source: U.S. Fish and Wildlife Service

76. You are choosing between two long-distance telephone plans. One plan has a monthly fee of \$15 with a charge of \$0.05 per minute. The other plan has a monthly fee of \$5 with a charge of \$0.07 per minute. For how many minutes of long-distance calls will the costs for the two plans be the same?

77. After a 20% price reduction, a cordless phone sold for \$48. What was the phone's price before the reduction?

78. A salesperson earns \$300 per week plus 5% commission of sales. How much must be sold to earn \$800 in a week?

79. The length of a rectangular field is 6 yards less than triple the width. If the perimeter of the field is 340 yards, what are its dimensions?

80. In 2005, there were 14,100 students at college A, with a projected enrollment increase of 1500 students per year. In the same year, there were 41,700 students at college B, with a projected enrollment decline of 800 students per year.

a. Let x represent the number of years after 2005. Write, but do not solve, an equation that can be used to find how many years after 2005 the colleges will have the same enrollment.

b. The following table is based on your equation in part (a). Y_1 represents one side of the equation and Y_2 represents the other side of the equation. Use the table to answer the following questions: In which year will the colleges have the same enrollment? What will be the enrollment in each college at that time?

X	Y_1	Y_2
7	24600	36100
8	26100	35300
9	27600	34500
10	29100	33700
11	30600	32900
12	32100	32100
13	33600	31300

X=7

In Exercises 81- 86, solve each formula for the specified variable.

81. $V = \frac{1}{3}Bh$ for h

82. $y - y_1 = m(x - x_1)$ for x

83. $E = I(R + r)$ for R

84. $C = \frac{5F - 160}{9}$ for F

85. $s = vt + gt^2$ for g

86. $T = gr + gvt$ for g

1.6 *In Exercises 87- 101, simplify each exponential expression. Assume that no denominators are 0.*

87. $(-3x^7)(-5x^6)$

88. x^2y^{-5}

89. $\frac{3^{-2}x^4}{y^{-7}}$

90. $(x^3)^{-6}$

91. $(7x^3y)^2$

92. $\frac{16y^3}{-2y^{10}}$

93. $(-3x^4)(4x^{-11})$

94. $\frac{12x^7}{4x^{-3}}$

95. $\frac{-10a^5b^6}{20a^{-3}b^{11}}$

96. $(-3xy^4)(2x^2)^3$

97. $2^{-2} + \frac{1}{2}x^0$

98. $(5x^2y^{-4})^{-3}$

99. $(3x^4y^{-2})(-2x^5y^{-3})$

100. $\left(\frac{3xy^3}{5x^{-3}y^{-4}}\right)^2$

101. $\left(\frac{-20x^{-2}y^3}{10x^5y^{-6}}\right)^{-3}$

1.7 *In Exercises 102- 103, write each number in decimal notation.*

102. 7.16×10^6

103. 1.07×10^{-4}

In Exercises 104- 105, write each number in scientific notation.

104. $-41{,}000{,}000{,}000{,}000$

105. 0.00809

In Exercises 106- 107, perform the indicated computations. Write the answers in scientific notation.

106. $(4.2 \times 10^{13})(3 \times 10^{-6})$

107. $\frac{5 \times 10^{-6}}{20 \times 10^{-8}}$

108. If the population of the United States is 2.9×10^8 and each person spends about \$150 per year going to the movies (or renting movies), express the total annual spending on movies in scientific notation.