Give a verbal description of each set. For example, {2, 4, 6, 8, . . .} *can be described as "the set of positive even integers."*

19. {3, 6, 9, 12, . . .}

20. {. . . , −4, −2, 0, 2, 4, . . .}

21. {January, February, March, April, May, June}

22. {Canada, United States, Mexico}

23. {1, 3, 5, 7, 9}

24. {3, 4, 5}

25. {2, 4, 6, 8}

26. {9, 10, 11, 12}

Find the value of each quantity. See Example 4.

27. $|-9|$

28. $|12|$

29. $-|6|$

30. $-|15|$

31. $-|-3|$

32. $-|-7|$

33. $-|16|$

34. $-|1|$

35. $|-2| + |3|$

36. $|-12| + |2|$

37. $|-8| - |3|$

38. $|-10| - |5|$

39. $|-6| - |-2|$

40. $|-3| - |-2|$

41. $|-12| + |-3|$

42. $|-15| + |-10|$

43. $|-9| - |-1|$

44. $|8| + |-11|$

Give the additive inverse of each. See Examples 3 and 4.

45. 8

46. 15

47. −9

48. −12

49. 0

50. −0

51. $-(-3)$

52. $-(-5)$

53. $|10|$

54. $|17|$

55. $-|8|$

56. $-|21|$

57. $-|-1|$

58. $-|-9|$

59. $-|-18|$

60. $-|-4|$

61. $|-2| + |-3|$

62. $|-9| + |-4|$

Which elements of the set

$$S = \left\{-6, -\sqrt{3}, -\frac{1}{2}, 0, \frac{2}{3}, \sqrt{2}, 2, 3, \frac{7}{2}, \frac{9}{2}, \frac{10}{2}\right\}$$

are elements of the following sets? See Example 5.

63. Natural numbers

64. Whole numbers

65. Integers

66. Rational numbers

67. Irrational numbers

68. Real numbers

Tell whether each statement is true *or* false.

69. Every rational number is an integer.

70. Every natural number is an integer.

71. Every irrational number is an integer.

72. Every integer is a rational number.

73. Every whole number is a real number.

74. Every natural number is a whole number.

75. Some rational numbers are irrational.

76. Some natural numbers are whole numbers.

77. Some rational numbers are integers.

78. Some real numbers are integers.

79. The absolute value of any number is positive.

80. The absolute value of any nonzero number is positive.

Let $N = \{x|x \text{ is a natural number}\}$, $Q = \{x|x \text{ is a rational number}\}$,
$W = \{x|x \text{ is a whole number}\}$, $H = \{x|x \text{ is an irrational number}\}$,
$I = \{x|x \text{ is an integer}\}$, $R = \{x|x \text{ is a real number}\}$.

Place $\subseteq$ or $\not\subseteq$ in each blank to make a true statement.

81. $\{1, 2, 9, 14\}$ ____ N **82.** $\{0, 3, 6, 9, 12\}$ ____ N
83. $\{5, 1, -3, -9, -11\}$ ____ I **84.** $\{-1, -3, -5, -7, \ldots\}$ ____ I
85. $\{1, 3, 5, 7, 9, 11, 13, \ldots\}$ ____ W **86.** $\{-1, 1\}$ ____ W
87. N ____ I **88.** N ____ Q
89. W ____ N **90.** W ____ I
91. I ____ Q **92.** Q ____ H
93. Q ____ R **94.** H ____ R
95. Q ____ Q **96.** $\emptyset$ ____ H

Place $\in$ or $\notin$ in each blank to make the statement true.

97. 4 ____ $\{-2, 0, 2, 4, 6\}$ **98.** -1 ____ $\{-3, -2, -1, 0, 4\}$
99. -9 ____ $\{-10, -8, -6, -4\}$ **100.** 3 ____ $\{-5, -4, -3, -2, -1\}$
101. $\{5\}$ ____ $\{2, 3, 4, 5, 6\}$ **102.** $\{7\}$ ____ $\{2, 4, 6, 7, 8, 9\}$

Under what conditions on sets A and B are the following statements true?

103. $A \subseteq B$ and $B \subseteq A$ **104.** $A = B$ and $B \subseteq A$ **105.** $A \neq B$ and $A \subseteq B$

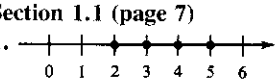
106. Suppose that $A = B$ and $B \subseteq C$. Is $A \subseteq C$?

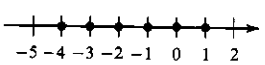
Under what conditions on the real number x are the following statements true?

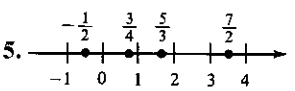
107. $|-x| = |x|$ **108.** $|x| = |x + 2|$ **109.** $|x| = -|x|$ **110.** $|x - 1| = |x + 1|$

CHAPTER 1

Section 1.1 (page 7)

1. 

3. 

5. 

7. $\{1, 2, 3, 4, 5, 6\}$ **9.** $\{12, 13, 14, 15, \ldots\}$ **11.** $\{12, 14, 16, 18, \ldots\}$ **13.** $\emptyset$
15. $\{3, -3\}$ **17.** $\{0, 5, 10, 15, \ldots\}$ **19.** The set of all counting number multiples of 3
21. The set of the first six months in a year **23.** The set of all odd integers between 0 and 10
25. The set of all even integers between 1 and 9 **27.** 9 **29.** -6 **31.** -3 **33.** -16
35. 5 **37.** 5 **39.** 4 **41.** 15 **43.** 8 **45.** -8 **47.** 9 **49.** 0 **51.** -3
53. -10 **55.** 8 **57.** 1 **59.** 18 **61.** -5 **63.** 2, 3, 10/2 (or 5) **65.** -6, 0, 2, 3, 10/2 (or 5) **67.** $-\sqrt{3}, \sqrt{2}$ **69.** False **71.** False **73.** True **75.** False
77. True **79.** False, since $|0| = 0$ **81.** $\subseteq$ **83.** $\subseteq$ **85.** $\subseteq$ **87.** $\subseteq$ **89.** $\not\subseteq$
91. $\subseteq$ **93.** $\subseteq$ **95.** $\subseteq$ **97.** $\in$ **99.** $\notin$ **101.** $\notin$ **103.** If $A = B$
105. There is at least one element of B that is not an element of A **107.** Always true **109.** If $x = 0$