SOLUTIONS TO EXERCISES:
MATHEMATICIANS ARE FOND OF COLLECTIONS

IN-SECTION EXERCISES:

1. The object(s) in a set are called the *element(s)* or *member(s)* of the set.

If a set has n members, where n is a whole number, then it is a *finite* set. Otherwise, it is an *infinite* set.

2. The sentence 'n is a whole number' is true when n is chosen from the set $\{0, 1, 2, 3, \dots\}$. Otherwise, the sentence is false.

4. The centered dots denote multiplication.

5. There are 5 members in the set $\{a, b, c, d, e\}$.

There are $5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$ different re-arrangements of the five-member set $\{a, b, c, d, e\}$.

6. Let $T = \{a, b, c, d, e\}$.

7. Let $S = \{7, 8, 9, \dots\}$.

8a. T

8b. T

8c. F

8d. T

8e. ST/SF

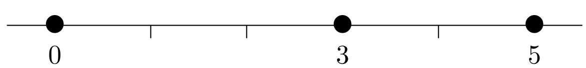
10a. EXP, number

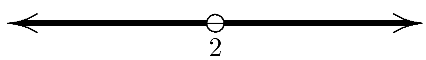
10b. EXP, set

10c. EXP, set

10d. SEN, T Read as: '5 is a member of the set of real numbers' or '5 is in the set of real numbers' or '5 is an element of the set of real numbers' or, most simply, '5 is a real number'

10e. SEN, F Read as: '5.1 is a member of the set of integers' or, most simply, '5.1 is an integer'

11a. 

11b. 

11c. 

12a. '1 is in the empty set'; false

12b. '0 is in the empty set'; false

12c. '0 is not in the empty set'; true

12d. 'x is not in the empty set'; (always) true

13a. EXP, set

13b. EXP, set

13c. EXP, number

13d. EXP, set

13e. SEN, F '1 is in the the set of real numbers between 1 and 2 , including 2 but not including 1'

13f. SEN, T '1 is in the set of real numbers between 1 and 2 , including 1 but not including 2'

14. The subsets of $\{a, b\}$ are: $\{a, b\}$, $\emptyset$, $\{a\}$, $\{b\}$. There are four subsets.

15. The subsets of $\{0, 2, 4\}$ are: $\{0, 2, 4\}$, $\emptyset$, $\{0\}$, $\{2\}$, $\{4\}$, $\{0, 2\}$, $\{0, 4\}$, $\{2, 4\}$. There are eight subsets.

16a. The set $\{-1,2,3\}$ *is* a subset of $\mathbb{R}$, since every member of $\{-1,2,3\}$ is a real number.

16b. The set $\{-1,2,3\}$ *is not* a subset of the whole numbers, because -1 is not a whole number.

16c. The set $\{-1,2,3\}$ *is* a subset of the integers, since every member of $\{-1,2,3\}$ is an integer.

16d. The set $\{-1,2,3\}$ *is* a subset of the interval $(-2,\infty)$, since every member of $\{-1,2,3\}$ is in the interval $(-2,\infty)$.

END-OF-SECTION EXERCISES:

17. EXP, set
18. SEN, T
19. SEN, T
20. EXP, set
21. SEN, F
22. SEN, T
23. SEN, T
24. $\{-1,0,1\}$
25. $(-1,1]$
26. $[0,2)$
27. $(-\infty,1]$
28. $(-1,\infty)$
29. There are eight subsets of $\{-1,0,1\}$: $\{-1,0,1\}$, $\emptyset$, $\{-1\}$, $\{0\}$, $\{1\}$, $\{-1,0\}$, $\{-1,1\}$, $\{0,1\}$.
30. The set of positive integers *is* a subset of $(-1,\infty)$, since every positive integer is in the interval $(-1,\infty)$.