

Prob/Stat/Discrete

Homework 1.1

Name _____

In Exercises 1-6 determine which collections are not well defined and therefore not sets.

1. The collection of U.S. Presidents.
2. The collection of part-time and full-time students currently enrolled at your college.
3. The collection of the five worst U.S. Presidents.
4. The collection of elderly full-time students currently enrolled at your college.
5. The collection of natural numbers greater than one million.
6. The collection of even natural numbers greater than 100.

In Exercises 7-10 write a description of each set. (More than one correct description may be possible.)

7. {Saturday, Sunday}
8. {April, August}
9. {9, 10, 11, 12, ...}
10. {9, 10, 11, 12, ..., 25}

In Exercises 11-16, express each set using the roster method.

11. The set of months of the year that have exactly 30 days.
12. $\{x \mid x \text{ is a letter of the alphabet that follows d and comes before j}\}$
13. The set of natural numbers less than or equal to 6
14. The set of even natural numbers less than 10
15. $\{x \mid x \in \mathbf{N} \text{ and } x \leq 4\}$
16. $\{x \mid x \in \mathbf{N} \text{ and } x > 4\}$

In Exercises 17-23, determine which sets are the empty set.

17. $\{0, \emptyset\}$
18. $\{x \mid x \text{ is a living U.S. president born before 1700}\}$
19. $\{x \mid x \text{ is the number of living U.S. presidents born before 1700}\}$
20. $\{x \mid x \text{ is a month of the year whose name begins with the letter X}\}$

21. $\{x \mid x < 3 \text{ and } x > 7\}$
22. $\{x \mid x \in \mathbf{N} \text{ and } 3 < x < 7\}$
23. $\{x \mid x \text{ is a number less than 3 or greater than 7}\}$

In Exercises 24-30, determine whether each statement is true or false.

24. $6 \in \{2, 4, 6, 8, 10\}$
25. $10 \in \{1, 2, 3, \dots, 16\}$
26. $8 \in \{1, 3, 5, \dots, 19\}$
27. $17 \notin \{1, 2, 3, \dots, 16\}$
28. $26 \notin \{1, 2, 3, \dots, 50\}$
29. $2 \in \{x \mid x \in \mathbf{N} \text{ and } x \text{ is odd}\}$
30. $20 \notin \{x \mid x \in \mathbf{N} \text{ and } x < 20\}$

In Exercises 31-35, find the cardinal number for each set.

31. $A = \{16, 18, 20, 22, 24, 26\}$
32. $B = \{2, 4, 6, \dots, 30\}$
33. $C = \{x \mid x \text{ is a month of the year that begins with the letter W}\}$
34. $D = \{\text{six}\}$
35. $A = \{x \mid x \text{ is a letter in the word six}\}$

In Exercises 36-39,

- a. Are the sets equivalent? Explain.
- b. Are the sets equal? Explain.

36. $A = \{1, 3, 5, 7, 9\}$
 $B = \{2, 4, 6, 8, 10\}$

37. $A = \{0, 1, 1, 2, 2, 2, 3, 3, 3, 3\}$
 $B = \{3, 2, 1, 0\}$

38. $A = \{x \mid x \in \mathbf{N} \text{ and } 12 < x \leq 17\}$
 $B = \{x \mid x \in \mathbf{N} \text{ and } 20 \leq x < 25\}$

39. $A = \{x \mid x \in \mathbf{N} \text{ and } 200 \leq x \leq 206\}$
 $B = \{x \mid x \in \mathbf{N} \text{ and } 199 < x < 207\}$

In Exercises 40-41, determine whether each set is finite or infinite.

40. $\{x \mid x \in \mathbf{N} \text{ and } x \geq 50\}$
41. $\{x \mid x \in \mathbf{N} \text{ and } x \leq 2,000,000\}$