

Worksheet 12.3: Venn Diagrams and Set Operations

Draw a Venn diagram that illustrates the situation described.

1. Set A and set B are disjoint sets.
2. $A \subset B$
3. $B \subset A$
4. $A = B$
5. Set A and set B are overlapping sets.
6. If we are given set A, how do we obtain A complement, A' ?
7. How do we obtain the union of two sets A and B, $A \cup B$?
8. How do we obtain the intersection of two sets A and B, $A \cap B$?

9. a) Which set operation is the word *or* generally interpreted to mean?
- b) Which set operation is the word *and* generally interpreted to mean?
10. Give the relationship between $n(A \cup B)$, $n(A)$, $n(B)$, and $n(A \cap B)$.
11. When constructing a Venn diagram with two sets, which region of the diagram do we generally complete first?
12. When constructing a Venn diagram with two sets, which region of the diagram do we generally complete last?
13. For the sets U , A , and B , construct a Venn diagram and place the elements in the proper regions.

$$U = \{ 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \}$$

$$A = \{ 1, 4, 6, 7, 9, 10 \}$$

$$B = \{ 2, 3, 4, 7, 8 \}$$

In exercises 14-19,

U is the set of universities in the United States

A is the set of universities in the U.S. that have the word State in their name

B is the set of universities in the U.S. that have the word South in their name.

Describe the following sets in words.

14. A'

15. B'

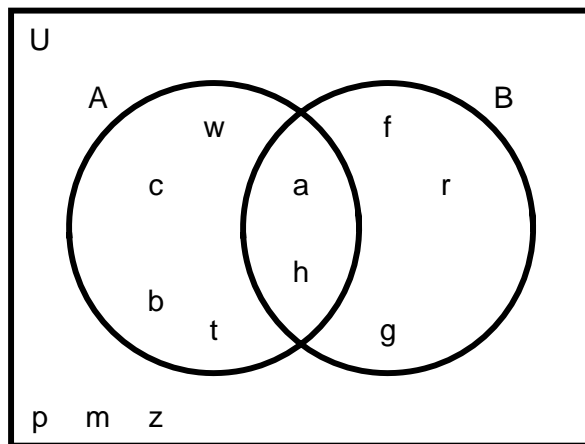
16. $A \cup B$

17. $A \cap B$

18. $A \cap B'$

19. $A \cup B'$

In exercises 20 - 27, use the Venn diagram below to list the set of elements in roster form.



20. B

21. A

22. U

23. $A \cap B$

24. $A \cup B$

25. $(A \cup B)'$

26. $(A \cap B)'$

27. $A' \cap B'$

In exercise 28- 37, let

$$U = \{a, b, c, d, e, f, g, h, i, j, k\}$$

$$A = \{a, c, d, f, g, i\}$$

$$B = \{b, c, d, f, g\}$$

$$C = \{a, b, f, i, j\}$$

28. A'

29. $B \cup C$

30. $A \cap C$

31. $A' \cup B$

32. $(A \cap C)'$

33. $(A \cap C) \cup B$

34. $A \cup (C \cap B)'$

35. $A \cup (C' \cup B')$

36. $A' \cap (B \cap C)$

37. $(C \cap B) \cap (A' \cap B)$