

28 Basic Concepts of Sets

Review It!

When you work with sets, remember these words:

set a collection of objects or elements

$\{0, 1, 2, 3, \dots\}$ is the set of whole numbers.

Venn diagram a picture, usually of one or more circles inside a rectangle, that shows how sets are related

empty set or null set a set with nothing in it

\emptyset is an empty set or a null set.

disjoint sets sets with no objects or elements in common

intersection of sets the objects or elements that sets have in common

union of sets the objects or elements in any of the sets

complement of a set the elements that are NOT in the set

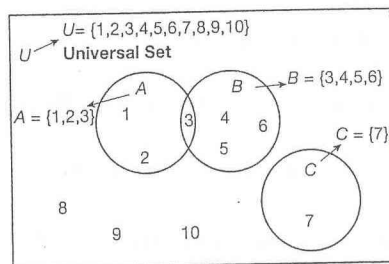
subset a set where every element is also an element of another set

The diagram is a Venn diagram.

Step 1 Observe.

Set A and set C are disjoint because they have no elements in common.

The intersection of set A and set B is the set of numbers



REMEMBER The intersection is the set of shared numbers.

The union of set A and set _____ is the set of the numbers in each set, $\{1, 2, 3, 4, 5, 6\}$.

THINK List the numbers only once.

The complement of set _____, C' , is $\{1, 2, 3, 4, 5, 6, 8, 9, 10\}$.

Set A is a subset of the universal set _____.

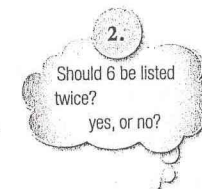
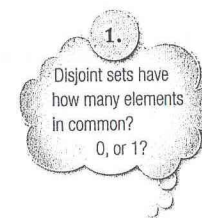
So, you can use a Venn diagram to find relationships.

Try It!

Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$,
 $A = \{2, 4, 6, 8, 10\}$, $B = \{1, 3, 5, 7, 9\}$,
 and $C = \{3, 6, 9\}$.

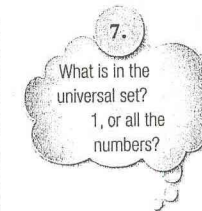
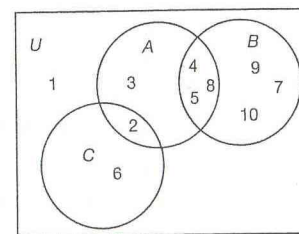


- Which sets are disjoint? _____ and _____
- What is the union of set A and set C ? _____
- What is the intersection of set B and set C ? _____
- What is the intersection of set A and set C ? _____
- What is the complement of C , C' ? _____
- What is the complement of A , A' ? _____



Use the Venn diagram below for questions 7–12.

- List the elements of set U . _____
- List the elements of set A . _____
- List the elements of set B . _____



- List the elements of set C . _____
- What is the union of set A and set C ? _____
- What is the intersection of set A and set B ? _____

On Your Own!

Circle the best answer for each question.

1. If $A = \{4, 8, 12, 16, 20\}$ and $B = \{5, 10, 15, 20, 25\}$, what is the intersection of sets A and B ?

- A. \emptyset
- B. $\{20\}$
- C. $\{4, 5, 20\}$
- D. $\{4, 5, 8, 10, 12, 15, 16, 20, 25\}$

2. If $L = \{0, 1, 2\}$ and $M = \{1, 2, 3\}$, what is the union of sets L and M ?

- A. \emptyset
- B. $\{1, 2\}$
- C. $\{0, 1, 2, 3\}$
- D. $\{1\}$

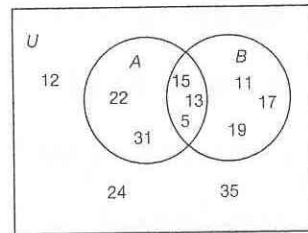
3. Which of the following sets is NOT a subset of $\{2, 5, 8, 11, 14\}$?

- A. $\{5, 9\}$
- B. $\{2, 5\}$
- C. $\{2, 5, 14\}$
- D. $\{5, 8, 11, 14\}$

4. Which sets are disjoint?

- A. {even numbers} and {factors of 40}
- B. {odd numbers} and {factors of 25}
- C. {factors of 30} and {factors of 24}
- D. {even numbers} and {factors of 15}

Use this Venn diagram to answer questions 5–7.



5. What is the intersection of sets A and B ?
- A. $\{22, 31\}$
 - B. $\{12, 24, 35\}$
 - C. $\{5, 13, 15\}$
 - D. $\{5, 11, 13, 15, 17, 19, 22, 31\}$
6. What is the union of sets A and B ?
- A. $\{22, 31\}$
 - B. $\{5, 11, 12, 13, 15, 17, 19, 22, 24, 31, 35\}$
 - C. $\{5, 13, 15\}$
 - D. $\{5, 11, 13, 15, 17, 19, 22, 31\}$
7. What is B' ?
- A. $\{11, 17, 19\}$
 - B. $\{12, 22, 24, 31, 35\}$
 - C. $\{5, 13, 15\}$
 - D. $\{12, 24, 35\}$

8. Let $A = \{\text{multiples of 5}\}$ and $B = \{\text{even numbers}\}$.

Part A Describe the intersection of sets A and B .

Part B Find the largest possible set of whole numbers that is disjoint with set B .

Math Words

Fill in the blanks.

9. Sets that have no elements in common are _____.
10. The set of elements that sets have in common is their _____.
11. The set of all the elements in two sets, listed once, is their _____.
12. A set that only contains elements of another set is a _____ of the other set.