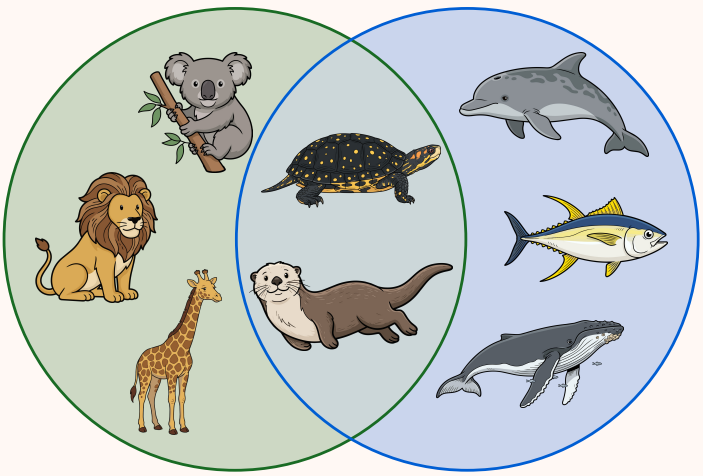


TOPIC: INTERSECTIONS & UNIONS

Intersections

New	Intersection
U Land Animals Water Animals 	U = the set of all animals A = the set of land animals B = the set of water animals $A \cap B$ = the set of animals that Intersection of two sets (A, B) is the set of all elements in ____ sets A AND B.

EXAMPLE

Let $U = \{2, 4, 5, 7, 8\}$, $A = \{2, 4, 5\}$, $B = \{4, 5, 7, 8\}$, $C = \{7, 8\}$. Find:

(A) $A \cap B =$

(B) $A \cap C =$

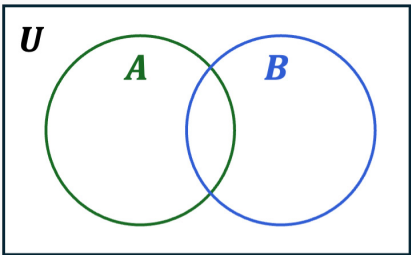
◆ Two sets which have _____ common elements are called **disjoint**.

TOPIC: INTERSECTIONS & UNIONS

PRACTICE

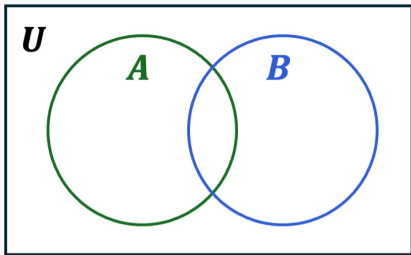
Let $U = \{10, 11, 12, 13, 14, 15, 16, 17\}$, $A = \{10, 12, 14, 16\}$, $B = \{11, 12, 15, 16\}$. Find:

(A) $A \cap B =$



(B) $A' \cap B =$

Recall
 $A' = U - A$



PRACTICE

Write the specified set using the roster method given
 $U = \{1, 2, 3, \dots, 20\}$, $E = \{2, 4, 6, \dots, 20\}$, $F = \{5, 10, 15, 20\}$

(A) $E \cap F$

(B) $F \cap U$

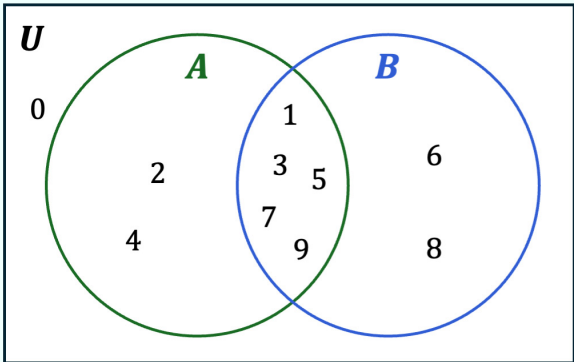
(C) $E \cap F'$

(D) $\emptyset \cap E$

EXAMPLE

Shade the set $A \cap B$ on the Venn diagram. Then write each set using the roster method.

Recall
 $A' = U - A$

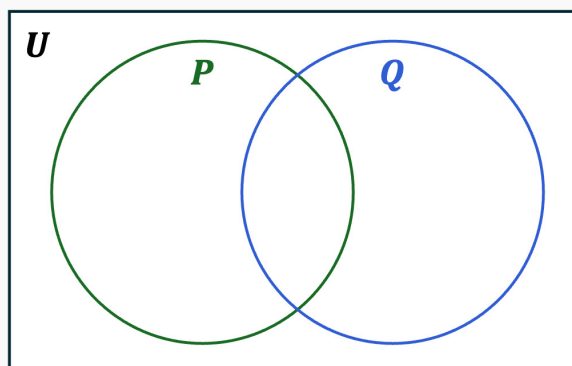


- | | | | |
|-----------|------|-------------------|------|
| $A = \{$ | $\}$ | $A \cap B = \{$ | $\}$ |
| $A' = \{$ | $\}$ | $A' \cap B = \{$ | $\}$ |
| $B = \{$ | $\}$ | $A \cap B' = \{$ | $\}$ |
| $B' = \{$ | $\}$ | $A' \cap B' = \{$ | $\}$ |
| $U = \{$ | $\}$ | | |

TOPIC: INTERSECTIONS & UNIONS

PRACTICE

Label the Venn diagram with the elements that belong in each set using $U = \{0, 1, 2, \dots, 9\}$, $P = \{2, 4, 6, 8\}$, $Q = \{3, 6, 9\}$. Then find & shade $P \cap Q$.

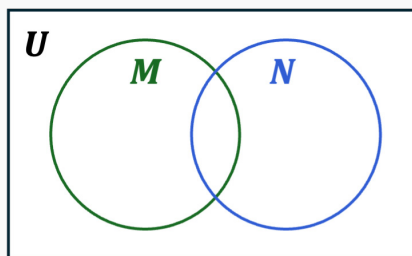


$$P \cap Q = \{$$

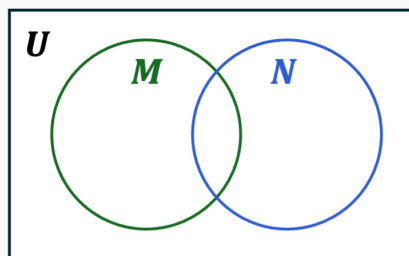
PRACTICE

Shade each of the following:

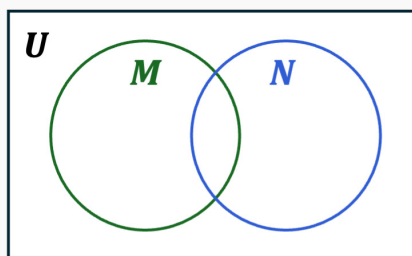
(A) $M \cap N$



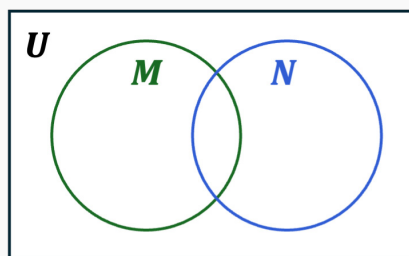
(B) $M' \cap N$



(C) $M \cap N'$



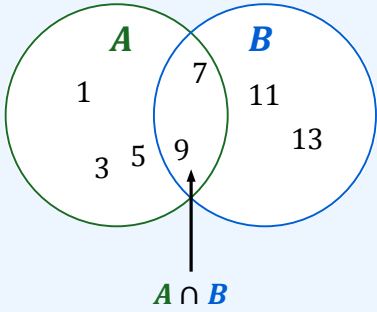
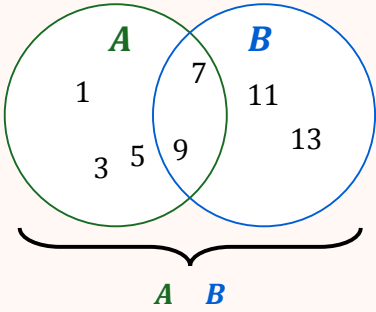
(D) $M' \cap N'$



TOPIC: INTERSECTIONS & UNIONS

Unions

EXAMPLE Let $A = \{1, 3, 5, 7, 9\}$ & $B = \{7, 9, 11, 13\}$, find $A \cap B$ & $A \cup B$.

Recall	Intersection	New	Union
	 Elements in BOTH sets $A \text{ [AND OR] } B$. (the overlap) $A \cap B =$		 Elements in _____ set $A \text{ [AND OR] } B$. (inside one or both circles) $A \cup B =$

PRACTICE Write the specified set using the roster method given
 $U = \{1, 2, 3, \dots, 20\}$, $E = \{2, 4, 6, \dots, 20\}$, $F = \{5, 10, 15, 20\}$

(A) $E \cup F$

(B) $E \cup U$

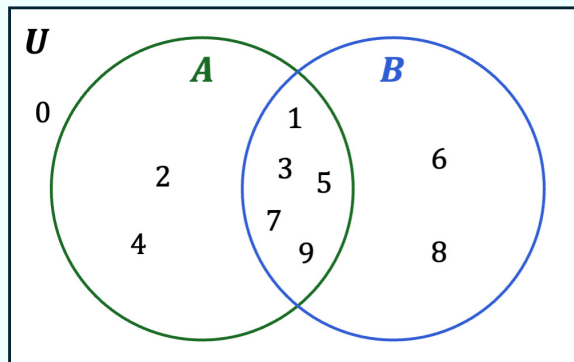
(C) $E' \cup F$

(D) $\emptyset \cup F$

TOPIC: INTERSECTIONS & UNIONS

EXAMPLE

Shade the set $A \cup B$ on the Venn diagram. Then write each set using the roster method.



$$A = \{1, 2, 3, 4, 5, 7, 9\}$$

$$A' = \{0, 6, 8\}$$

$$B = \{1, 3, 5, 6, 7, 8, 9\}$$

$$B' = \{0, 2, 4\}$$

$$U = \{0, 1, 2, \dots, 9\}$$

$$A \cup B = \{ \quad \quad \quad \}$$

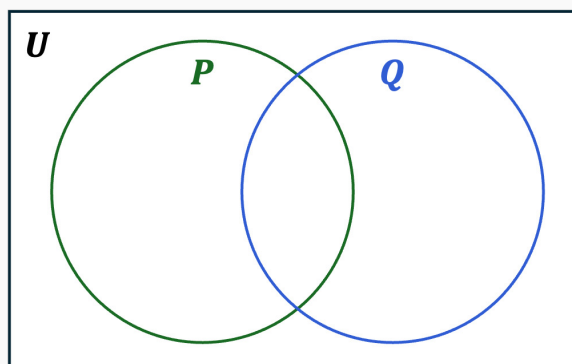
$$A' \cup B = \{ \quad \quad \quad \}$$

$$A \cup B' = \{ \quad \quad \quad \}$$

$$A' \cup B' = \{ \quad \quad \quad \}$$

PRACTICE

Label the Venn diagram with the elements that belong in each set using $U = \{0, 1, 2, \dots, 9\}$, $P = \{2, 4, 6, 8\}$, $Q = \{3, 6, 9\}$. Then find & shade $P \cup Q$.



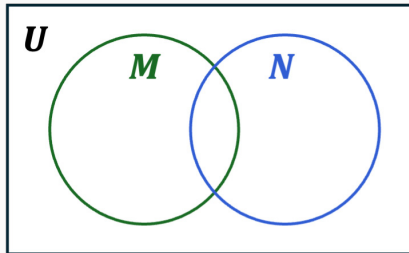
$$P \cup Q = \{ \quad \quad \quad \}$$

TOPIC: INTERSECTIONS & UNIONS

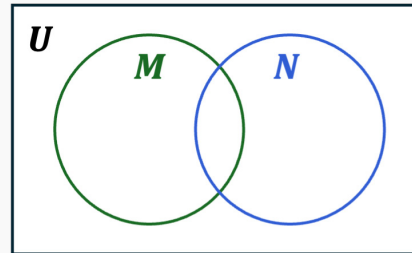
PRACTICE

Shade each of the following:

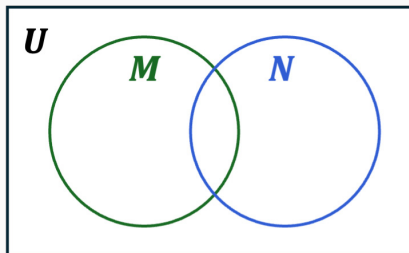
(A) $M \cup N$



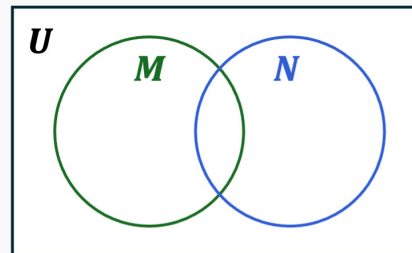
(B) $M' \cup N$



(C) $M \cup N'$



(D) $M' \cup N'$



EXAMPLE

A small shop recorded purchases made by its customers during a weekend sale. The following information was obtained: 28 customers bought T-shirts, 20 customers bought caps, 9 customers bought both T-shirts and caps, 23 customers bought neither item.

(A) Define the sets relevant to this problem.

(B) How many customers bought a T-shirt and a cap? Represent this using sets.

(C) How many customers bought a T-shirt or a cap? Represent this using sets.



TOPIC: INTERSECTIONS & UNIONS

Using Multiple Set Operations

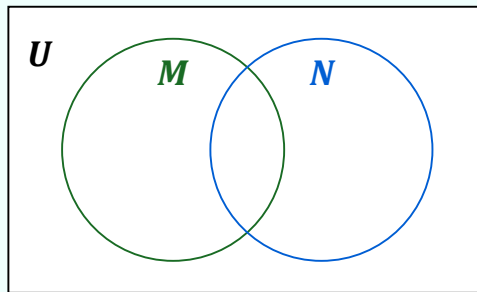
◆ When performing *multiple* set operations, ALWAYS work inside _____ FIRST.

EXAMPLE

Using $U = \{1, 3, 5, 7, 8, 9, 11, 12\}$, $M = \{3, 5, 8\}$, $N = \{9, 11, 3\}$ find each of the following.

(A) $(M \cup N)'$

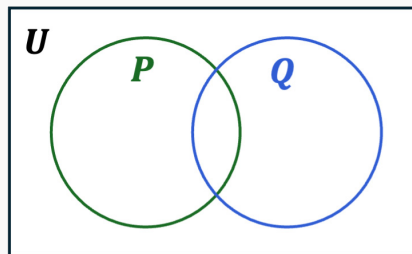
(B) $M' \cap (M \cup N)'$



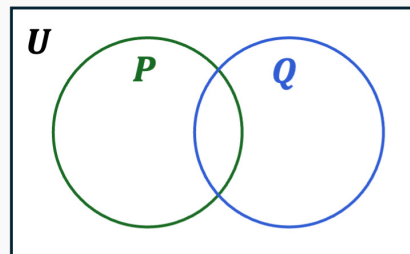
PRACTICE

Shade each of the following on the Venn diagrams.

(A) $P \cap (P \cap Q)'$



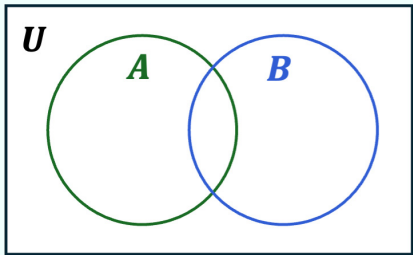
(B) $(P' \cap Q) \cup (P \cap Q)$



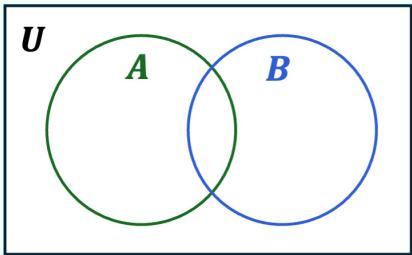
TOPIC: INTERSECTIONS & UNIONS

EXAMPLE Shade each of the following on the Venn diagrams.

(A) $(A \cap B)'$



(B) $A' \cup B'$



(C) What can you conclude about the relationship between $(A \cap B)'$ & $A' \cup B'$?

PRACTICE

Write the specified set using the roster method given
 $U = \{a, b, c, d, e, f, g, h\}$, $M = \{a, b, d\}$, $N = \{b, d, f, h\}$

(A) $M \cap (M \cup N)$

(B) $(M \cup N') \cap (M' \cup N)$

(C) $N' \cap (M \cup U)$

(D) $(\emptyset \cup M') \cup N$

PRACTICE

Use the Venn diagram to find each of the following.

(A) $A' \cap B'$

(B) $(A \cup B)'$

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

