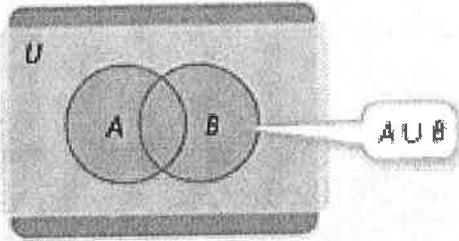


Algebra I  
Section 3.8 Notes  
Unions and Intersections of Sets

Name: Key

Key Definitions:

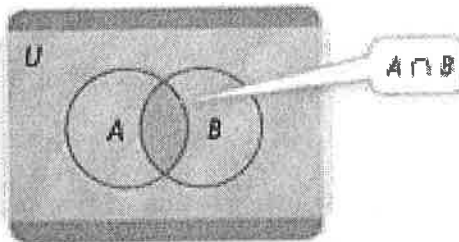
1. The union of two or more sets is the set that contains all elements within each of the sets.



$$A = \{1, 3, 4, 5, 6\} \quad B = \{2, 4, 7, 8\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8\}$$

2. The intersection of two or more sets is the set of elements that are common within each set.



$$A = \{1, 3, 4, 5, 6\} \quad B = \{2, 4, 7, 8\}$$

$$A \cap B = \{4\}$$

3. disjoint sets have no elements in common.

Practice Problems

$$D = \{-4, -3, -2\}$$

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

Find each union or intersection. Let  $A = \{1, 3, 5, 7, 9\}$ ,  $B = \{x \mid x \text{ is a positive odd integer less than } 10\}$ ,  $C = \{1, 2, 4, 7\}$ , and  $D = \{x \mid x \text{ is a negative integer between } -5 \text{ and } -1\}$ .

1.  $A \cup B$

$$\{1, 3, 5, 7, 9\}$$

2.  $A \cap C$

$$\{1, 7\}$$

3.  $A \cap D$

$$\{\emptyset\}$$

4.  $B \cup C$

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

5.  $B \cap D$

$$\{\emptyset\}$$

6.  $C \cup D$

$$\{-4, -3, -2, 1, 2, 4, 7\}$$

7.  $A \cap B$

$$\{1, 3, 5, 7, 9\}$$

8.  $A \cup C$

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

9.  $A \cup D$

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

10.  $A \cap B \cap C$

$$\{1, 7\}$$

11.  $D \cup C \cup B$

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

12.  $A \cap C \cap D$

$$\{\emptyset\}$$

13.  $A \cap B \cap D$

$$\{\emptyset\}$$

14.  $A \cup C \cup D$

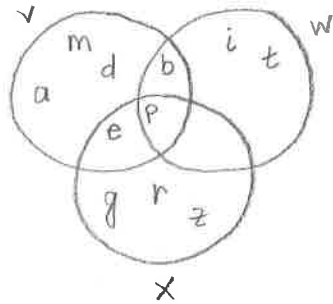
$$\{-4, -3, -2, 1, 2, 3, 4, 5, 7, 9\}$$

15.  $B \cap C \cap D$

$$\{\emptyset\}$$

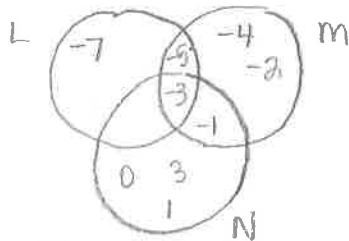
Draw a Venn diagram to represent the union and intersection of these sets.

1. Let  $V = \{p, m, b, a, d, e\}$ ,  $W = \{i, t, b, p\}$ , and  $X = \{g, r, z, p\}$ .



2. Let  $L = \{\text{all negative odd integers between } -1 \text{ and } -9\}$ ,  $M = \{\text{all negative integers greater than or equal to } -5\}$ , and  $N = \{-2, -1, 0, 3, 1\}$ .

$$L = \{-7, -5, -3, -1\} \quad M = \{-5, -4, -3, -2, -1\}$$



Solve each inequality. Write the solutions as either the union or intersection of two sets.

1.  $|2x - 3| \leq 11$

$$\begin{aligned} 2x - 3 &\leq 11 & 2x - 3 &\geq -11 \\ +3 &+3 & +3 &+3 \end{aligned}$$

$$\frac{2x}{2} \leq \frac{14}{2}$$

$$x \leq 7$$

$$\frac{2x}{2} \geq \frac{-8}{2}$$

$$x \geq -4$$

Intersection



2.  $50 > 7n + 8 > 22$

$$\begin{aligned} 50 > 7n + 8 & & 7n + 8 > 22 \\ -8 & -8 & -8 & -8 \end{aligned}$$

$$\frac{42}{7} > \frac{7n}{7}$$

$$6 > n$$

$$\frac{7n}{7} > \frac{14}{7}$$

$$n > 2$$

Intersection



3.  $12 > |4d + 16|$

$$\begin{aligned} 12 > 4d + 16 & & -12 < 4d + 16 \\ -16 & -16 & -16 & -16 \end{aligned}$$

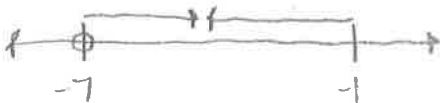
$$\frac{-4}{4} > \frac{4d}{4}$$

$$-1 > d$$

$$\frac{-28}{4} < \frac{4d}{4}$$

$$-7 < d$$

Intersection



4.  $-5 < -n + 3 < 10$

$$\begin{aligned} -5 < -n + 3 & & -n + 3 < 10 \\ -3 & -3 & -3 & -3 \end{aligned}$$

$$\frac{-8}{-1} < \frac{-n}{-1}$$

$$8 > n$$

$$\frac{-n}{-1} < \frac{7}{-1}$$

$$n > -7$$

Intersection

