

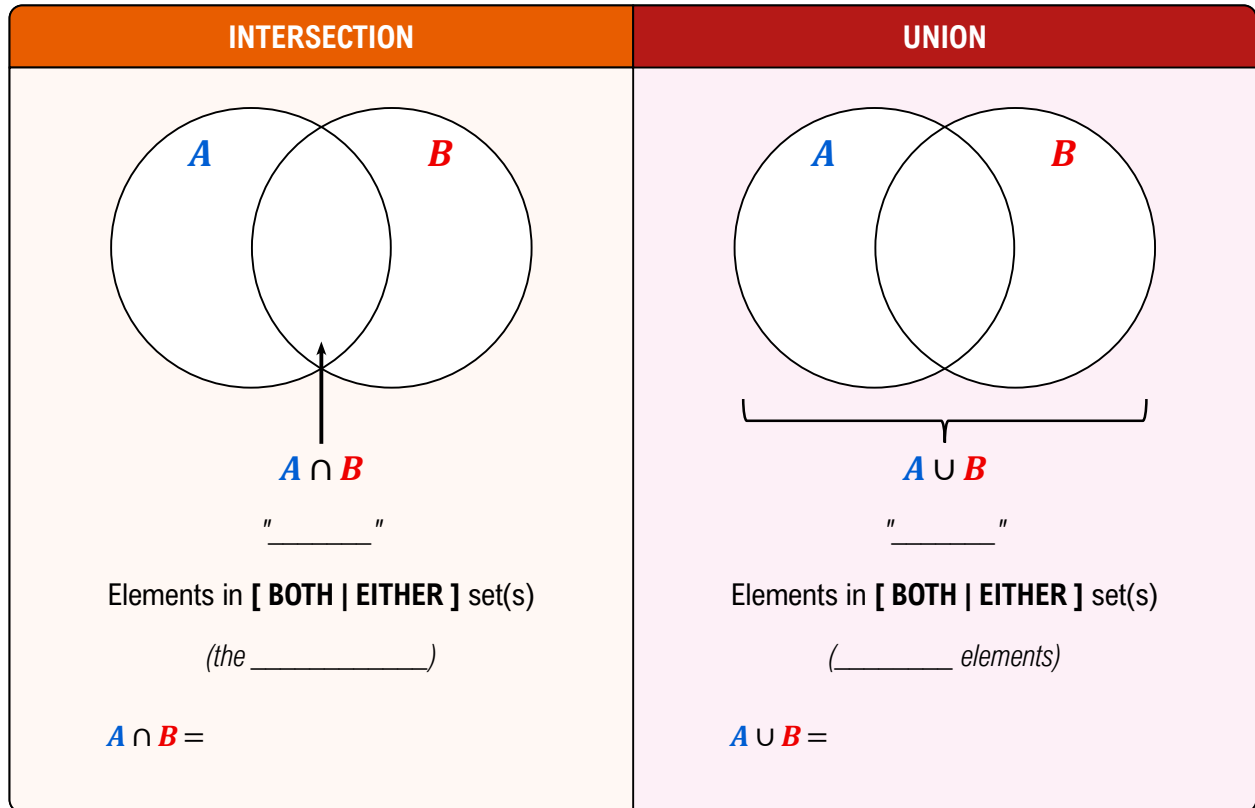
TOPIC: SET OPERATIONS AND COMPOUND INEQUALITIES

Intersection and Union of Sets

◆ Solving more advanced inequalities will involve the **intersection** (____) or **union** (____) of sets.

EXAMPLE

If $A = \{1, 3, 5, 7, 9\}$ and $B = \{7, 9, 11, 13\}$, find $A \cap B$ and $A \cup B$.



◆ The *empty* set has ____ elements and is denoted by empty brackets $\{ \}$ or by the symbol $\emptyset$.

TOPIC: SET OPERATIONS AND COMPOUND INEQUALITIES

PRACTICE

Given $A = \{2, 4, 6, 8\}$, $B = \{4, 8, 12, 16\}$, $C = \{8\}$, find the following:

(A)

$$A \cap C$$

(B)

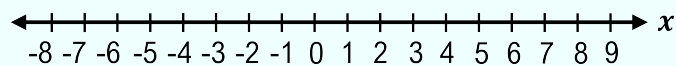
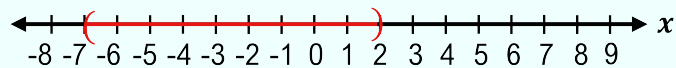
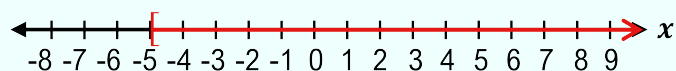
$$A \cup B$$

(C)

$$C \cap \emptyset$$

EXAMPLE

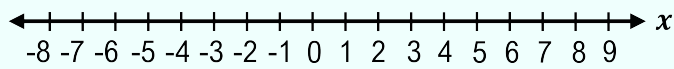
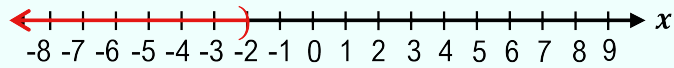
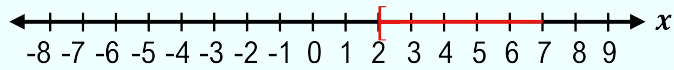
Sketch the intersection of each of these pairs of sets.



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EXAMPLE

Sketch the union of each of these pairs of sets.



TOPIC: SET OPERATIONS AND COMPOUND INEQUALITIES

Solving Compound Inequalities Containing "and"

- ◆ A compound inequality is two inequalities linked by either " _____ " or " _____ ".
- ▶ The solution of an "and" compound inequality is the _____ of the two solution sets.

EXAMPLE

Solve the compound inequality $3x < 6$ and $x + 1 \geq 0$.

New

Compound Inequalities: "and"

$$3x < 6$$

and

$$x + 1 \geq 0$$

Graph of Intersection:

Interval Notation:

Recall

$\geq$ or $\leq \rightarrow$ Include with [or]

$>$ or $< \rightarrow$ Exclude with (or)

(Interval Notation)

TOPIC: SET OPERATIONS AND COMPOUND INEQUALITIES

PRACTICE

Solve the compound inequality. Express the answer in interval notation.

(A) $-3x + 1 \leq 4$ and $x - 2 < 3$

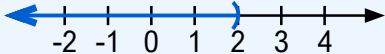
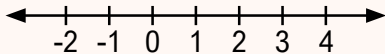
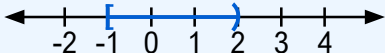
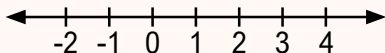
(B) $x + 1 \leq 9$ and $x + 2 > 3$

TOPIC: SET OPERATIONS AND COMPOUND INEQUALITIES

Solving Compound Inequalities Containing "or"

◆ Recall: A compound inequality is two inequalities linked by either "*and*" or "*or*".

► The solution of an "*or*" compound inequality is the _____ of the two solution sets.

Recall	Compound Inequalities: "and"	New	Compound Inequalities: "or"
	$x < 2$ and $x \geq -1$		$x \geq 3$ or $x < 0$
			
	Intersection:		Union:
			
	Interval Notation: $[-1, 2)$		Interval Notation:

TOPIC: SET OPERATIONS AND COMPOUND INEQUALITIES

PRACTICE

Solve the compound inequality. Express the answer in interval notation.

(A) $\frac{x}{3} > 2$ or $4x + 1 < 5$

(B) $2x - 3 \leq 1$ or $-x + 4 \leq 10$

EXAMPLE

Translate the following into a compound inequality and solve.

A movie theatre offers a student discount to customers under 18 years old, and a senior discount to customers aged 60 up. If a represents a person's age, write and solve a compound inequality to represent the ages that qualify for a discount.