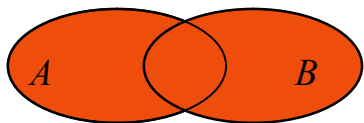


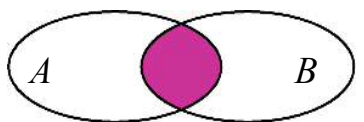
2.6 Operations on Sets and Compound Inequalities

Sets can be added, multiplied, or subtracted as follows:



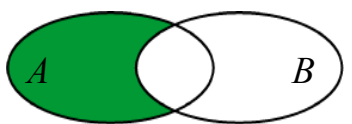
SUM or **UNION**

$$A \cup B = \{x | x \in A \text{ or } x \in B\}$$



PRODUCT or **INTERSECTION**
or COMMON PART

$$A \cap B = \{x | x \in A \text{ and } x \in B\}$$



DIFFERENCE

$$A \setminus B = \{x | x \in A \text{ and } x \notin B\}$$

Example 1:

Let $A = \{1,2,3,4\}$, $B = \{1,3,5\}$, $C = \{5,6\}$. Find:

a) $A \cap B =$

b) $A \cup B =$

c) $A \setminus B =$

d) $B \cap C =$

e) $A \cap C =$

f) $A \cup B \cup C =$

g) $A \cap B \cap C =$

h) $C \cap \emptyset =$

Example 2: Find:

a) $(-1,3) \cap [2,5] =$

b) $(-1,3) \cup [2,5] =$

c) $(-\infty, 5] \cap [-3, \infty) =$

d) $(-\infty, -3] \cap [-3, \infty) =$


e) $(-\infty, -3] \cap (-\infty, 5) =$

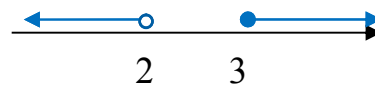
f) $(-\infty, -3] \cup (-\infty, 5) =$

compound inequalities – system of inequalities with the connecting word **AND** or **OR**,

for example: $2 \leq x < 3$, or $x < 2$ **or** $x \geq 3$

(or equivalently $2 \leq x$ and $x < 3$)

solution set:  A number line with arrows at both ends. There is a solid blue dot at 2 and an open blue circle at 3. A blue line segment connects the dot and the circle, with arrows at the ends of the line segment pointing towards the dot and the circle.

 A number line with arrows at both ends. There is an open blue circle at 2 and a solid blue dot at 3. From the circle at 2, a blue line segment with an arrow pointing left extends to the left. From the dot at 3, a blue line segment with an arrow pointing right extends to the right.

Example 3: Solve. Give the answer in interval notation and graph the solution set.

a) $2 < 3x - 1 < 5$ notice that these inequalities could be written equivalently as
 $2 < 3x - 1$ **and** $3x - 1 < 5$

b) $2 > 3x - 1$ **or** $3x - 1 \geq 5$

special cases:

c) $5 - 7x > 19$ **and** $2 - 3x < -4$

d) $4x - 4 < -8$ **or** $4x - 4 \leq 12$

e) $2x - 7 \geq 3$ **or** $7 - x \geq 0$

Example 4: Let P represent the percent of children covered by private insurance, M the percent covered by Medicaid, and N the percent not covered. Using the information from the table, give the years that the following is true:

- a) $P \geq 68$ **and** $M \geq 18$
- b) $P \geq 68$ **or** $M \geq 18$
- c) $P \geq 67$ **and** $N \leq 12.5$
- d) $P \geq 67$ **or** $N \leq 12.5$

	Private insurance <input type="checkbox"/>	Medicaid <input type="checkbox"/>	Not covered <input type="checkbox"/>
1998	68.4	17.1	12.7
1999	68.8	18.1	11.9
2000	67.0	19.4	12.4
2001	66.7	21.2	11.0

Source: U.S. Department of Health and Human Services