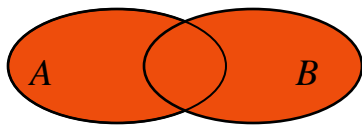


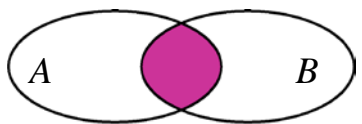
**L.5 Operations on Sets and Compound Inequalities**

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



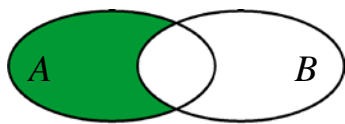
SUM or **UNION**

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



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

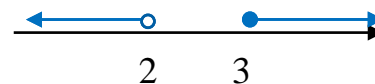
f)  $(-\infty, -3] \cup (-\infty, 5) =$

**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: 



*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**  $N \leq 12.5$

U.S. Health Care Coverage for Persons Under 18 Years of Age (in percent)			
	Private insurance	Medicaid	Not covered
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