Introduction to Sets

Sets are simply collections of items.

A set may contain your favorite even numbers, the days of the week, or the names of your brothers and sisters. The items contained within a set are called **elements,** and elements in a set do not "repeat".

1. Set Roster – A list of the elements in a set with { } around the elements.

   A = {2,3,4,5} includes_____

   B = {1,3,5,7,9} includes_____

2. Set Builder Notation - A shorthand way of writing elements of a set.

   X = {x|x is a factor of 16} includes_____
   "x such that x is a factor of 16"

   Y = {x|x is a multiple of 3} includes_____

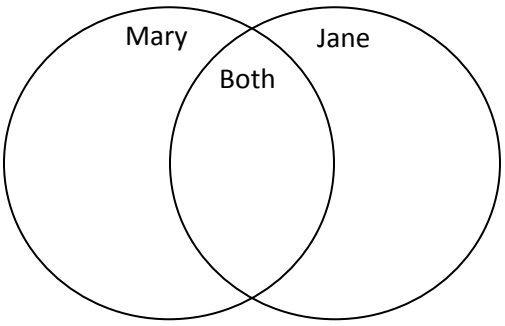
Empty set _____ It is defined by the symbol _____

Universal Set _____

Complement of a set_____

Union of Two or More Sets (∪)	**Intersection of Two or More Sets (∩)**

Example Problem:
Mary and Jane wanted to paint a picture but could only use the colors of the rainbow. Mary chose orange, blue, purple and green. Jane chose to use red, orange, and blue.



Universal set:

Mary ∪ Jane:

Mary ∩ Jane:

Complement of (Mary ∪ Jane):

Union

Union (∪) of two or more sets includes **ALL of the elements of ALL of the sets**.
The elements in a set do not repeat

For Example:

A = {1,3,5,7,9} and B = {2,4,6,8,10}

A ∪ B = {1,2,3,4,5,6,7,8,9,10}

1. Given: Q = {1,4,6,9}
   R = {1,3,6,8}
   What is the Union of the two sets?

2. Given: P = {Sunday, Monday, Tuesday}
   O = {Thursday, Friday, Saturday}
   What is set P ∪ O?

3. Set A is a set of integers from 0 to 5. Set B is a set of odd integers from 1 to 9.
   Find A ∪ B.

4. Given Y = {x|x is a factor of 8}
   Z = {x|x is a factor of 20}
   Find Y ∪ Z.

5. Given: A = {J,A,K,E}
   B = {B,E,T,H,A,N,Y}
   C = {T,H,O,M,A,S}
   Find the Union of the 3 Sets.

Intersection

Intersection (∪) of two or more sets includes **where the elements overlap**.

The elements in a set do not repeat

For Example:

A = {1,3,5,7,9} and B = {1,2,3,4,5}

A ∩ B = {1,3,5}

1. Given: M = {1,4,6,9}

   N = {1,3,6,8}

   What is the Intersection of the two sets?

2. Given: D = {January, March, April, May}

   L = {April, May, July, September}

   What is set D ∩ L?

3. Set A is a set of even integers. Set B is a set of odd integers from 1 to 9.

   Find A ∩ B.

4. Given G = {x|x is a factor of 24}

   O = {x|x is a factor of 18}

   Find G ∩ O.

5. Given: A = {J,A,K,E}

   B = {B,E,T,H,A,N,Y}

   C = {T,H,O,M,A,S}

   Find the Intersection of the 3 Sets.

Complement

Complement of a set is the **elements that are NOT in the set**.

The elements in a set do not repeat

For Example:

If the universal set U = {0,1,2,3,4,5,6,7,8,9,10}

and

A = {1,3,5,7,9}

$(A)' = \{0,2,4,6,8,10\}$

1. Given: U = $\{0 \leq x \leq 10\}$

   N = {1,3,6,8}

   If Set U is the universal set, what is the complement of Set N?

2. Given: U = {The 7 days of the week}

   L = {Monday, Tuesday, Friday }

   What is set **(L)**'

3. Given: Set $U = \{S,O,P,H,I,A\}$

   Set $B = \{A,I,O\}$

   If set B is a subset of set U, what is the complement of set B?

4. Given U = {x|x is a factor of 20}

   O = {x|x is a factor of 10}

   Find **(O)**'.

Interval Notation

Interval Notation is an **alternative to expressing your answer as an inequality**.

For the most part, we will use these with compound inequalities.

Use ( ) _____ and [ ] _____

For Example:

Inequality: $-4 \leq x \leq 6$	Inequality: $0 < x \leq 20$
Interval Notation: $[-4, 6]$	**Interval Notation:** $(0, 20]$

Try These: Write each Inequality in Interval Notation.

1. $2 < x < 5$	2. $10 \leq x < 23$	3. $-5 \leq x \leq -1$

On your Own: **Write the Compound Inequality First.**

1. All numbers between 1 and 5 including the 1 and the 5.

2. All numbers greater than or equal to 5 and less than 12.

3. All numbers greater than 2 but less than or equal to 20.

4. All numbers between -3 and 3, inclusive.