Name: _____ Algebra I: Period _____
Topic: Sets and Set Notation Date: _____

Set { }:_____

Elements ($\in$): _____

There are two ways to represent sets using { }:

Roster Notation:

Set Builder Notation:

Example: Write the following statements using both roster notation and set notation

a. The set of whole numbers less than five.

Roster Notation:

Set Builder Notation:

b. The set of integers greater than or equal to negative four.

Roster Notation:

Set Builder Notation:

We can also represent sets using *Inequalities* or *Interval Notation*

Inequalities: greater than ($>$), less than ($<$), greater than or equal to ($\geq$), or less than or equal to ($\leq$)

Interval Notation:

Brackets [ ] when endpoints are included

Parenthesis ( ) when endpoints are not included

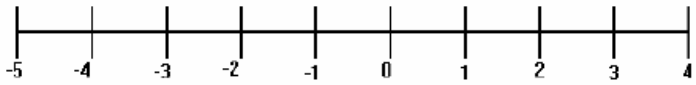
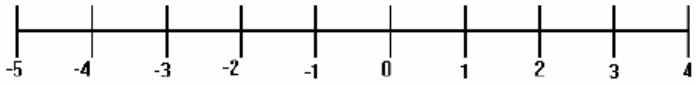
NOTE: Use parenthesis when you use $-\infty$ or ∞

Examples: Complete the following charts:

Chart 1

In Words	Inequality	Interval Notation
Numbers Less than 3		
Numbers Greater than or equal to -2		
Numbers greater than four, but less than or equal to ten		

Chart 2

Set Builder	Interval	Graph
		
	$[2, \infty)$	
$\{ x \mid -3 < x \leq 4 \}$		

A ***Subset*** is: _____

Example: If Set A = $\{ x \mid x$ is an integer$\}$ and Set B = $\{ x \mid x$ is a counting number$\}$ then we say that

Set ____ is a ***Subset*** of Set ____

The ***Complement*** of a set is: _____

Example: If M = {1, 2, 3, 4, 5} and P = {2, 3} then the complement of P in M is what? _____

The Intersection ($\cap$) of two Sets: _____

Example: C = {6, 9, 12, 15, 18} and D = $\{ x \mid x$ is a positive odd integer$\}$. What is C $\cap$ D?

The Null Set: _____

Example: A = { x | x is an even integer} and B ={ x | x is an odd integer}. What is $A \cap B$?

The Union (C) of two Sets: _____

Example: Find $P \cup Q$ when P={5, 10, 15, 20} and Q = {8, 10, 18, 20}

Mixed Examples:

1. For each roster notation or set notation, write using the other notation:

   a. B = { 11, 12, 13, 14, …}

   b. M = { x | x is a positive multiple of 2, and $x < 18$}

   c. P = { 1, 3, 5, 7, 9, 11, 13, 15, 17, 19}

2. Let A = {1, 2, 3, 4, 5, 6} and B = {1, 2, 3}.

   a. Find the complement of B in A. b. Find $A \cap B$ c. Find $A \cup B$

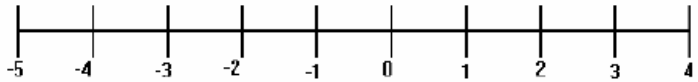
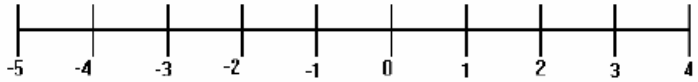
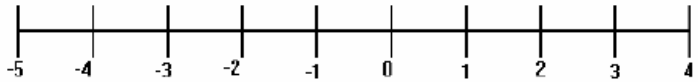
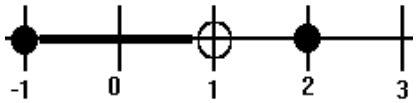
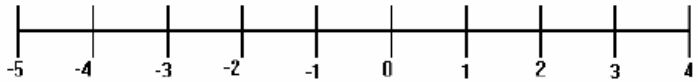
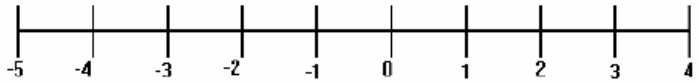
3. Find the union, and intersection of each of the following sets:

   a. A = (0, 2) and B = [2, 5) b. A = {red, blue, yellow} and B = {green, red}

4. Determine if A is a subset of B. If so, find the complement of A in B.

   a. A = $(0, \infty)$ and B = $(-\infty, \infty)$ b. A = {2, 3, 5, 7, 9} and B = {1, 3, 5, 7, 9, 11, 13}

Directions: Complete the following table

	Set Builder Notation	Interval Notation	Graph
1.	$\{x \in \mathbb{R} \mid x < 1 \text{ or } x \geq 4\}$		
2.		$(-4, 0) \cup (1, \infty)$	
3.			
4.	$\{x \in \mathbb{R} \mid -5 \leq x < 4\}$		
5.		$(-\infty, 2) \cup (2, \infty)$	
6.			
7.	$\{x \in \mathbb{R} \mid x < -3 \text{ or } -2 \leq x \leq 3\}$		
8.		$(-\infty, -4] \cup (-2, \infty)$	
9.			
10.	$\{x \in \mathbb{R} \mid x \leq -2 \text{ or } -1 < x < 4\}$