

Roster, Interval, and Set Notation

It used to be that when you finished a math problem, your teacher would tell you to box the answer, so that she (or he) wouldn't have to search the paper to find it. Though boxing your answer is still useful to teachers everywhere, higher mathematics expects you to do more than just tell us where the answer is. From now on, you will be expected to write your numerical answers in the proper notation (way of writing sets of numbers).

There are three kinds of notation:

Roster Notation: uses fancy brackets $\{ \}$ to write **lists of numbers** from least to greatest.

Example: $x = 2$ or 3 becomes $\{2, 3\}$

Set-Builder Notation: uses fancy brackets $\{ \}$ and the standard opening: " $x |$ " (which means: "x such that") to write a **span of numbers** (such as from -6 to 9). The answer is written as an inequality.

Example: $-6 < x \leq 9$ becomes $\{x | -6 < x \leq 9\}$

(*"x such that -6 is less than x, which is less than or equal to 9"*)

Interval Notation: uses parentheses $()$ and square brackets $[]$ to write inequalities. They are written with the lower number of the interval on the left, followed by a comma and then the greater number on the right. You use the **parenthesis** to show that the starting or ending number is **not included**, and the **square brackets** to show that the starting or ending number is **included**.

Example: $-6 < x \leq 9$ becomes $(-6, 9]$

If the starting or ending number doesn't exist, because the answer keeps going forever like $x > 2$, use the infinity symbol (∞) . Starting with forever is $-\infty$, and ending with it is ∞ . Always use $()$ with ∞ !!!!

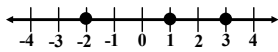
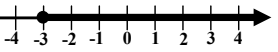
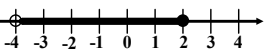
Example: $x \geq 2$ starts at 2, but gets bigger forever

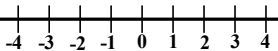
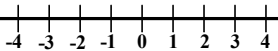
so... $[2, \infty)$ **equal to 2 means it's included, so use square bracket [**

Example: $x < 3$ ends at 3, but gets smaller forever (remember: smaller is on the left)

so... $(-\infty, 3)$ **not equal to 2 means it's not included, so use parenthesis)**

For each "answer" below, decide which notation(s) you would use to write it properly, write it in proper notation(s), and graph that "answer" on the given number line. Then, write how you would say the answer using words.

"Answer" & Notation Style	Proper Notation(s)	Number Line	Written Answer
$x = 3, 1, \text{ and } -2$ I would use _____ Roster Notation.	$x = \{-2, 1, 3\}$ <i>Notice that they are written in order from least to greatest.</i>	 <i>Just mark the three points on the line.</i>	X is equal to negative 2, positive 1, and positive 3.
$x \geq -3$ I would use _____ Set-Builder or Interval Notation.	$\{x x \geq -3\}$ just add $\{x \}$ or $[-3, \infty)$ <i>x is bigger than or equal to -3 until forever so -3 is smallest; it ends at ∞</i>	 <i>A closed circle means or equal to (like [). Darken the line and arrow getting bigger forever.</i>	X is greater than or equal to negative 3.
$-4 < x \leq 2$ I would use _____ Set-Builder or Interval Notation.	$\{x -4 < x \leq 2\}$ use $\{x \}$ or $(-4, 2]$ <i>x is greater than but not equal to -4, and less than or equal to 2].</i>	 <i>An open circle means not equal to (like (); a closed circle means or equal to (like]). Shade between.</i>	Negative 4 is less than x, which is less than or equal to positive 2.

1. $x < 1$ I would use _____ Notation.			
2. $x = 0, 2, \text{ and } -4$ I would use _____ Notation.			

3. $x = -3, 1, 4,$ and 0 I would use _____ Notation.		
4. $-2 \leq x \leq 0$ I would use _____ Notation.		
5. $x \geq -1$ I would use _____ Notation.		
6. $x \leq -2$ I would use _____ Notation.		
7. $x = 2$ I would use _____ Notation.		
8. $x > 1$ I would use _____ Notation.		
9. $x = -4, -2, 0, 2,$ and 4 I would use _____ Notation.		
10. $x = -3, -4,$ and 4 I would use _____ Notation.		
11. $x < 4$ I would use _____ Notation.		
12. $2 < x < 4$ I would use _____ Notation.		
13. $x \geq 0$ I would use _____ Notation.		
14. $-3 \leq x \leq -1$ I would use _____ Notation.		
15. $x = 1$ and 2 I would use _____ Notation.		
16. $x > 3$ I would use _____ Notation.		