VANCOUVER
COMMUNITY
COLLEGE

Inequalities

RULES

1. If you multiply or divide both sides of an inequality by a negative number, you must reverse the inequality sign. *Do not* reverse the sign when adding or subtracting negative numbers.
2. When working with absolute values in equations, isolate the absolute value on one side of the equation before proceeding.
3. $|a - b| = |b - a|$ (e.g. $|x - 3| = |3 - x|$)

INTERVAL NOTATION VS. SET-BUILDER NOTATION

Interval Notation:
1. Write the lowest number at the edge of the interval first.
2. If the number is included in the interval, use a [square bracket]. If the number is not included in the interval, use a (round bracket).
3. Do the same for the number at the other end of the interval.
4. If there is no smallest number (or no largest number) use −∞ (or ∞). Since infinity is not a number, you must use (round brackets) on these symbols.
   Ex: "The numbers greater than or equal to 3" can be written as [3, ∞)
5. For more than one interval, connect them using the intersection symbol:

   $(-\infty, -1] \cup [3, \infty)$

Set-Builder Notation:
In curly brackets, write "{x |" and then write the inequality. Close the brackets. e.g. "The numbers greater than or equal to 3": {x | x ≥ 3}. If your teacher is very mathematically precise, s/he may want you to say that the answer is a real number: {x | x ∈ ℝ, x ≥ 3}

LINEAR INEQUALITIES
To solve a linear inequality:

1. Isolate the inequality for y.
2. Find the line for the graph as though it were an equation instead of an inequality.
   a. If the inequality symbol is "≤" or "≥", draw the line as a solid line.
   b. If the inequality symbol is "<" or ">", draw the line as a dotted line.
3. Select a point on the plane that is **not** on the line. Substitute the coordinates of the point into the inequality. (The origin, (0, 0), is a good choice because it's easy.)
   a. If the coordinates make the inequality true, shade the side of the line that has the point.
   b. If the coordinates make the inequality false, shade the other side.

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