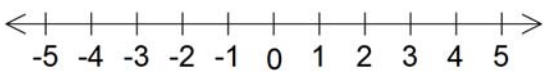
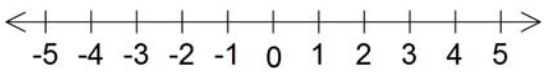
Absolute Value Inequalities

Recall that absolute value is the distance away from zero. The distance is ALWAYS positive.

$|x| < 4$



$|x| \geq 3$



Less Than: ($\leq, <$)

1. Isolate the absolute value: $|\text{expression}| < \textit{number}$
2. RE-write without the absolute value sign. Use a "sandwich" inequality:
   $-\textit{number} < \text{expression} < \textit{number}$
3. Solve.
4. Graph answer on a number line.
5. Write answer in interval notation.

Greater Than: ($\geq, >$)

1. Isolate the absolute value: $|\text{expression}| > \textit{number}$
2. RE-write without the absolute value sign. You must separate into 2 inequalities:
   $\text{expression} > \textit{number}$ or $\text{expression} < -\textit{number}$
3. Solve.
4. Graph answers on a number line.
5. Write answer in interval notation.

Example 1: $|x-4| \leq 8$

Example 2: $|x+2| > 9$

Example 3: $|3x-1|-2\geq 9$

Example 4: $2|x+3|+5<11$

Example 5: $|5x-13|+7\leq 6$

Example 6: $|3x+1|+5>1$