## Inequalities containing Absolute Value

## Algorithm

1. Isolate the absolute value
2. Set the expression and the opposite of the expression on the inside of the absolute value signs using the given inequality sign to the number on the outside
3. Solve the resulting two inequalities.
4. Abs V less than is "and"; Abs V greater then is an "or" statement

Example Solve $|2 x-5|<11$
If $2 x-5$ is positive, then AND If $2 x-5$ is negative, then

$$
\begin{aligned}
2 x-5 & <11 \\
2 x & <16 \\
x & <8
\end{aligned}
$$

$$
\begin{aligned}
-(2 x-5) & <11 \\
2 x-5 & >-11 \\
2 x & >-6
\end{aligned}
$$

$$
x>-3
$$

The solution is all the numbers between -3 and $8, \quad\{-3<x<8\}$

## Solve and graph the following inequalities.

Hint, first determine, by inspection, if it is an "and" or "or" statement.

1. $|\mathbf{x}|<7$
2. $|x-1| \geq 8$
3. $|2 x+1| \leq 13$
4. $|x-2|+4<10$
5. $|2 x-3| \geq 13$
6. $|3(x-2)|>12$
7. $4|3 x-3|<12$
8. $2|2 x-1|+1>15$
9. $|-4 x|<10$
10. $|3 x-1| \geq 5 x+15$
11. $|2 x-6|<0$
12. $|5(2 x+3)| \geq-10$
