

## TWO TYPES:

LESS THAN (< or ≤): <sup>AND</sup> ANDGREATER THAN (> or ≥): OR  
GreaterSHADE together  $\circ \text{---} \circ$ SHADE apart  $\leftarrow \circ \quad \circ \rightarrow$ 

1. Split into two inequalities  
 a. change sign of #  
 b. flip inequality sign
2. Solve & Graph

Example 1:  $|x+4| \leq 10$

$$\begin{array}{l} x+4 \leq 10 \quad \text{AND} \quad x+4 \geq -10 \\ -4 \quad -4 \quad \quad \quad -4 \quad -4 \end{array}$$

$$\boxed{x \leq 6 \quad \text{AND} \quad x \geq -14}$$



Example 2:  $|x+3| > 7$

$$\begin{array}{l} x+3 > 7 \quad \text{OR} \quad x+3 < -7 \\ -3 \quad -3 \quad \quad \quad -3 \quad -3 \end{array}$$

$$\boxed{x > 4 \quad \text{OR} \quad x < -10}$$



Example 3:  $|2x+3| < 7$

$$\begin{array}{l} 2x+3 < 7 \quad \text{AND} \quad 2x+3 > -7 \\ -3 \quad -3 \quad \quad \quad -3 \quad -3 \end{array}$$

$$\frac{2x < 4}{2 \quad 2} \quad \text{AND} \quad \frac{2x > -10}{2 \quad 2}$$

$$\boxed{x < 2 \quad \text{AND} \quad x > -5}$$



Example 4:  $|6-3x| \geq 12$

$$\begin{array}{l} 6-3x \geq 12 \quad \text{OR} \quad 6-3x \leq -12 \\ -6 \quad -6 \quad \quad \quad -6 \quad -6 \end{array}$$

$$\frac{-3x \geq 6}{-3 \quad -3} \quad \quad \quad \frac{-3x \leq -18}{-3 \quad -3}$$

$$\boxed{x \leq -2 \quad \text{OR} \quad x \geq 6}$$



Key

Example 5:  $|\frac{1}{2}x| \geq 3$

$$\begin{array}{l} \frac{1}{2}x \geq 3 \quad \text{OR} \quad \frac{1}{2}x \leq -3 \\ \hline -\frac{2}{1} \cdot \frac{1}{2}x \geq 2 \cdot \frac{2}{1} \quad -\frac{2}{1} \cdot \frac{1}{2}x \leq -4 \cdot \frac{2}{1} \\ \hline x \leq -4 \quad \text{OR} \quad x \geq 8 \end{array}$$



Example 6:  $|\frac{1}{4}x - 2| \geq 1$

$$\begin{array}{l} \frac{1}{4}x - 2 \geq 1 \quad \text{OR} \quad \frac{1}{4}x - 2 \leq -1 \\ \hline 4 \cdot \frac{1}{4}x - 2 \geq 3 \cdot 4 \quad 4 \cdot \frac{1}{4}x - 2 \leq 1 \cdot 4 \\ \hline x \geq 12 \quad \text{OR} \quad x \leq 4 \end{array}$$



**CLASSWORK:** Complete the following problems and show to one of your teachers to get credit for the day!

1.  $|2x - 2| \leq 4$

$$\begin{array}{l} 2x - 2 \leq 4 \quad \text{AND} \quad 2x - 2 \geq -4 \\ \hline \frac{2x}{2} \leq \frac{6}{2} \quad \frac{2x}{2} \geq \frac{-2}{2} \\ \hline x \leq 3 \quad \text{AND} \quad x \geq -1 \end{array}$$



$|4 - x| \geq 8$

$$\begin{array}{l} 4 - x \geq 8 \quad \text{OR} \quad 4 - x \leq -8 \\ \hline -x \geq 4 \quad -x \leq -12 \\ \hline x \leq -4 \quad \text{OR} \quad x \geq 12 \end{array}$$



2.  $|x + 5| \geq 12$

$$\begin{array}{l} x + 5 \geq 12 \quad \text{OR} \quad x + 5 \leq -12 \\ \hline x \geq 7 \quad \text{OR} \quad x \leq -17 \end{array}$$



4.  $|\frac{1}{2}x - 2| < 4$

$$\begin{array}{l} \frac{1}{2}x - 2 < 4 \quad \text{AND} \quad \frac{1}{2}x - 2 > -4 \\ \hline 2 \cdot \frac{1}{2}x - 2 < 6 \cdot 2 \quad 2 \cdot \frac{1}{2}x - 2 > -2 \cdot 2 \\ \hline x < 12 \quad \text{AND} \quad x > -4 \end{array}$$

