
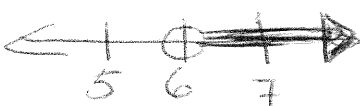
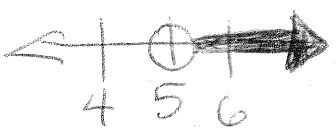
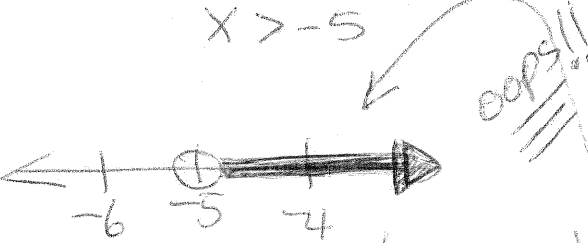


# Advanced Inequalities

Let's first review by graphing the solution set to the following inequalities...

$\begin{array}{r} 3x + 5 \geq 13 \\ \hline +5 \quad +5 \\ \hline 3x \geq 18 \\ \hline \div 3 \quad \div 3 \\ \hline x \geq 6 \end{array}$ 	$\begin{array}{r} \frac{x}{2} - 13 > -10 \\ \hline +13 \quad +13 \\ \hline \frac{x}{2} > 3 \\ \hline \times 2 \quad \times 2 \\ \hline x > 6 \end{array}$ 
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Now try these...

$\begin{array}{r} 2x > 10 \\ \hline \div 2 \quad \div 2 \\ \hline x > 5 \end{array}$ 	$\begin{array}{r} -2x > 10 \\ \hline \div -2 \quad \div -2 \\ \hline x > -5 \end{array}$ 
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Does anything appear odd???

Try 6 in the first one...  $2(6) > 10$   
 $12 > 10$  ✓

But what about 6 in the second one...  $-2(6) > 10$   
 $-12 > 10$

Advanced Rule for Inequalities...

When you multiply or divide by a negative number, you must reverse the direction of the inequality sign. Then solve as usual.

**REVERSE**

The arrow should be shaded in the other direction!!!  
 This is not true!

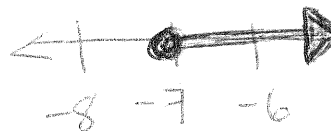
$$\begin{array}{r} 3x > 27 \\ \hline -3 & -3 \end{array}$$

$$x < -9$$



$$\begin{array}{r} -6x \leq 42 \\ \hline -4 & -6 \end{array}$$

$$x \geq -7$$



$$\begin{array}{r} x - 12 < 8 \\ \hline -3 & +12 & +12 \end{array}$$

$$\cancel{(-3)} \frac{x}{\cancel{-3}} < 20 \cancel{(-3)}$$

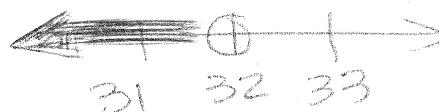
$$x > -60$$



$$\begin{array}{r} x + 5 > -11 \\ \hline -2 & -5 & -5 \end{array}$$

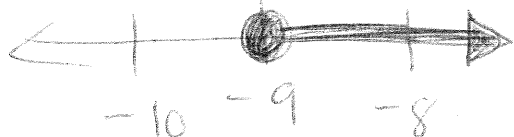
$$\cancel{(-2)} \frac{x}{\cancel{-2}} > -16 \cancel{(-2)}$$

$$x < 32$$



$$\begin{array}{r} 3x \geq -27 \\ \hline 3 & 3 \end{array}$$

$$x \geq -9$$



$$\begin{array}{r} -60 \leq -6x \\ \hline -6 & -6 \end{array}$$

$$10 \geq x$$

