

Section 6-4: Multi-Step Inequalities

Review:

When graphing an inequality:

- 1. Find the # on the # line and circle it.**
- 2. Open circle if $<$ or $>$
Filled in circle if \leq or \geq**
- 3. Is the variable bigger or smaller than the #?
Shade that side.**

Graph the following:

$$x < 4$$



$$y \geq -3$$



$$-5 < w$$



$$1 \geq z$$



Solving Inequalities:

- 1. Use the distributive property or combine like-terms.**
- 2. Get the variable alone by adding or subtracting.**
- 3. Multiply or Divide to solve for the variable.**
- 4. Check your answer.**

Same steps as solving equations

****Remember, if you multiply or divide by a negative number, you must flip the inequality sign.****

$$\frac{-2x}{-2} < \frac{8}{-2}$$
$$x > -4$$

$$\frac{(-3)y}{-3} > 6(-3)$$
$$y < -18$$

$$\frac{4w}{4} < \frac{-20}{4}$$
$$w < -5$$

Ex 1: $3(w + 7) < 12$

$$3w + 21 < 12$$
$$-21 \quad -21$$

$$w < -9/3$$

$$w < -3$$

Ex 2: $-5x + 3 + 2x \geq 30$

$$-3x + 3 \geq 30$$
$$-3 \quad -3$$

$$-3x \geq 27$$

$$-3x \geq 27$$
$$-3 \quad -3$$
$$x \leq -9$$

Ex 3: $12x + 2 > 2x - 82$

$+82$ $+82$
 ~~$12x + 84 > 2x$~~
 ~~$-12x$~~ ~~$-12x$~~

$\frac{84}{-10} > -\frac{10}{-10}x$

$\frac{84}{-10} < x$

$\frac{42}{-5} < x$

Ex 4: $4 < \frac{z}{-2} + 1$

-1 -2 -1
 ~~$(-2)3 < \frac{z}{-2}(-2)$~~

$-6 > z$

Ex. 5:

$$\cancel{3} \frac{(x+5)}{\cancel{3}} > 2 \cdot 3$$

$$x+5 > 6$$

$$\begin{array}{c} -5 \quad -5 \\ \hline x > 1 \end{array}$$