ALG I – §3-3 NOTES

Algebra 1

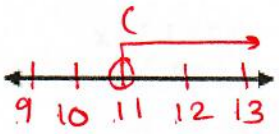
Lesson 3.3: Solving Inequalities using Multiplication or Division

Objective: *To use operations to solve one-step inequalities*
To graph inequalities on the number line

Warm-Up Solve and graph each inequality.

a) $x-5>6$

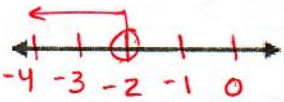
$x>11$



b) $-5>x-3$

$-2>x$

$x<-2$

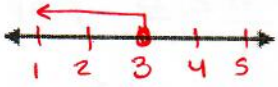


c) $2.5\geq -0.5+x$

$+.5 \quad +.5$

$3\geq x$

$x\leq 3$



Compare the numbers → 0 < 5 < 10 < 15 < 20

What happens when we multiply by -1 → 0 > -5 > -10 > -15 > -20

opposite value ⇒ opposite inequality

***Solving inequalities, is the *SAME* process as solving an equation **EXCEPT** when you divide or multiply both sides by a negative #, you MUST FLIP the inequality.

FLIP or DON'T FLIP Determine if the operation would "flip" or "don't flip" the inequality.

a) divide by -3 — FLIP

b) subtract 5 — don't flip

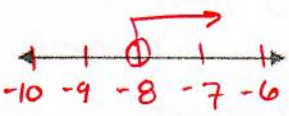
c) multiply by $\frac{1}{2}$ — don't flip

d) multiply by -2 — FLIP

Example 1 Solve and graph each inequality.

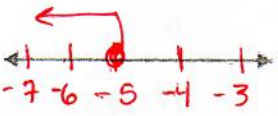
a) $\frac{1}{2}x>-4$ (×2)

$x>-8$



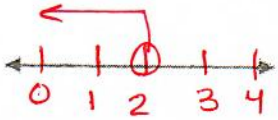
b) $-2x\geq 10$ (÷ −2)

$x\leq -5$



c) $\frac{x}{-2}>-1$ (× −2)

$x<2$ FLIP



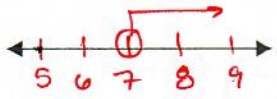
Example 2 Mixed Review - Solve and graph each inequality.

a. $12 < x + 5$

$-5 \quad -5$

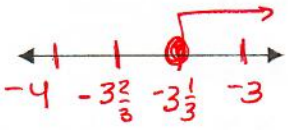
$7 < x$

$x > 7$



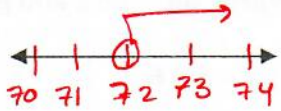
b. $\frac{3p}{3} \geq \frac{-10}{3}$ Don't FLIP

$p \geq -3\frac{1}{3}$



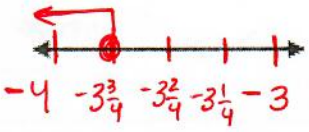
c. $\frac{-6}{\left(-\frac{m}{6}\right)} < \frac{-6}{(-12)}$ FLIP

$m > 72$



d. $\frac{-4x}{-4} \geq \frac{15}{-4}$ FLIP

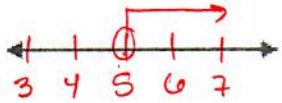
$x \leq -3\frac{3}{4}$



e. $\frac{-45}{-9} > \frac{-9x}{-9}$ FLIP

$5 < x$

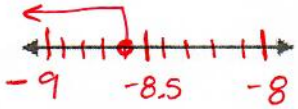
$x > 5$



f. $-7.3 \geq 1.3 + x$

$-1.3 \quad -1.3$

$-8.6 \geq x$



Example 3 Inequality Word Problems: Set up an ***inequality*** for each situation and then solve.

a. The hard drive on your computer has a capacity of 120 gigabytes (GB). You have used 85 GB. You want to save some home videos to your hard drive. What are the possible sizes of the home video collection you can save?

let g = # of gigabytes remaining

$g \leq 120 - 85$

$g \leq 35$

You have 35 GB available.

b. You walk dogs in your neighborhood after school. You earn $4.50 per dog. How many dogs do you need to walk in order to earn at least $75.

let d = # of dogs you need to walk

$\frac{4.50}{4.50} d \geq \frac{75}{4.50}$

$d \geq 16.\overline{6}$

You need to walk at least 17 dogs.