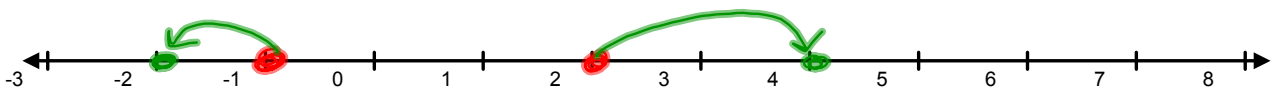


Section 6.5: Solving Linear Inequalities by using Multiplication and Division

Examine the following number line:

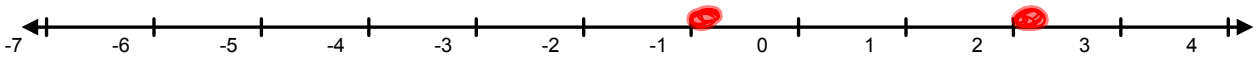
* Plot -1 and 2 on a number line:



$$-1 < 2$$

* Multiply both sides of the inequality
by 2. $\therefore (-1)(2) < (2)(2)$
 $-2 < 4$ True \therefore

* Plot -1 and 2 on a number line:



* $-1 < 2$

→ Multiply both sides of the inequality by -3

∴ $-1 < 2$

$(-1)(-3) < (2)(-3)$

$3 < -6$ False! ∴

* To make inequality true, switch from $<$ to $>$.

∴ $3 > -6$

Rule: If you multiply or divide both sides of an inequality by a negative number, you must switch the inequality sign.

Example #1: Solve and graph each inequality:

$$(A) \quad -5t \leq 25$$

$$\text{Ans) } \frac{-5t}{-5} \leq \frac{25}{-5} \quad \therefore t \geq -5$$



$$(B) \quad \frac{k}{3} \geq -2$$

* Multiply both sides by 3. 903

$$\text{(Ans) } \frac{3 \times k}{3} \geq 3 \times (-2)$$

$$\frac{3k}{3} \geq -6 \quad \therefore k \geq -6$$



(Ex 2) Solve and graph the following:

$$-2a + 14.6 > -5.2 + 1.8a$$

$$\cancel{-2a} + 14.6 + \cancel{2a} > -5.2 + 1.8a + 2a$$

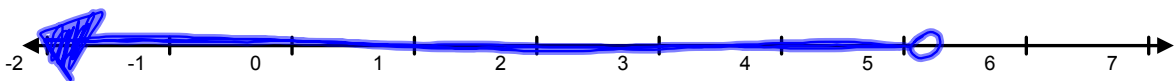
$$14.6 > -5.2 + 3.8a$$

$$14.6 + 5.2 > \cancel{-5.2} + 3.8a + \cancel{5.2}$$

$$\frac{19.8}{3.8} > \frac{3.8a}{3.8} \therefore 5.2 > a$$

$$\text{or}$$

$$a < 5.2$$



Ex #3 Solve 2 ways: $-5(n-2) \geq 110$

Method 1: Distributive Property

$$-5(n-2) \geq 110$$

$$-5n + 10 \geq 110$$

$$-5n + \cancel{10} - 10 \geq 110 - 10$$

$$\frac{-5n}{-5} \geq \frac{100}{-5} \quad \therefore n \leq -20$$

Method 2

$$\frac{-5(n-2)}{-5} \geq \frac{110}{-5}$$

$$n-2 \leq -22$$

$$\cancel{n-2} + 2 \leq -22 + 2 \quad \therefore n \leq -20$$

Ex #4 Solve the following inequality:

$$-2(1.4v - 0.7) \geq -4(0.2 + 0.3v)$$

(Ans) $-2.8v + 1.4 \geq -0.8 - 1.2v$

$$-2.8v + 1.4 + 2.8v \geq -0.8 - 1.2v + 2.8v$$

$$1.4 \geq -0.8 + 1.6v$$

$$1.4 + 0.8 \geq -0.8 + 1.6v + 0.8$$

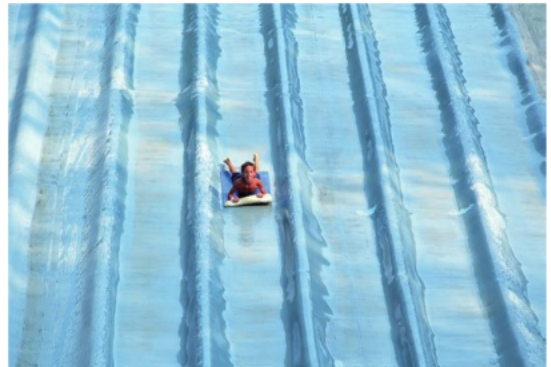
$$\frac{2.2}{1.6} \geq \frac{1.6v}{1.6} \quad \therefore 1.375 \geq v$$

$$\underline{\underline{v}} \leq 1.375$$

Ex #5

A super-slide charges \$1.25 to rent a mat and \$0.75 per ride. Haru has \$10.25. How many rides can Haru go on?

- Choose a variable, then write an inequality to solve this problem.
- Solve the problem.
- Graph the solution.



(A) $L + N = \#$ of rides Haru can go on.

$$1.25 + 0.75N \leq 10.25$$

$$1.25 + 0.75N - 1.25 \leq 10.25 - 1.25$$

(b)

$$\frac{0.75N}{0.75} \leq \frac{9}{0.75}$$

$$\therefore N \leq 12$$

∞ Haru can go on 12 rides or less.

Homework:

p305-306

#9, 10, 11, 16, 18