

## Section 6.5 - Solving Linear Inequalities by Using Multiplication and Division

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Consider  $-2 < 2$

What happens to the inequality if we multiply or divide each side by the same positive #?

$-2 < 2$  multiply by 2.

$$-2(2) < 2(2)$$

$$-4 < 4 \quad \checkmark \quad \text{still true}$$

$-2 < 2$  divide by 2.

$$\frac{-2}{2} < \frac{2}{2}$$

$$-1 < 1 \quad \checkmark \quad \text{still true}$$

### \* Property of Inequalities \*

When each side of an inequality is multiplied or divided by the same positive number, the resulting inequality is still true.

Consider  $-2 < 2$

what happens to the inequality when we multiply or divide each side by the same negative number?

$-2 < 2$  multiply by  $-2$

$$-2(-2) < 2(-2)$$

$4 \not< -4$  not true

therefore we need to reverse the inequality sign to make it true

so  $-2 < 2$

$$-2(-2) < 2(-2)$$

$$4 > -4$$

→ must change sign

$\frac{-2}{-2} < \frac{2}{-2}$  divide by  $-2$

$1 \not< -1$  not true

to make the inequality true we must reverse the inequality sign.

$$\text{so } \frac{-2}{-2} < \frac{2}{-2}$$

$$1 > -1$$

→ must reverse sign

**\* Property of Inequalities \***

when each side of an inequality is multiplied or divided by the same negative number, the inequality sign must be reversed for the inequality

## Ⓐ Solving One-Step Inequalities

Examples: ①  $\frac{4x}{4} < \frac{-12}{4}$

$$x < -3$$

\* divide by same positive # so leave sign as is.

②  $\frac{-2c}{-2} \leq \frac{8}{-2}$

$$c \geq -4$$

Since I divided by the same negative # I have to reverse the sign.

③ ~~3~~  $\frac{b}{2} \leq 3(2)$

$$b \leq 6$$

④ ~~4~~  $\frac{v}{-3} > 4(-3)$

$$v < -12$$

reverse sign  $\Rightarrow$  multiply by neg. #.

### ⑤ Solving a Multi-Step Inequality

Example: Solve:  $1 - \frac{2}{3}x > 3$  then graph

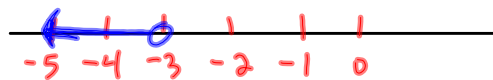
$$\textcircled{1} 1 - \frac{2}{3}x > 3$$

$$-\frac{2}{3}x > 3 - 1$$

$$\textcircled{2} -\frac{2}{3}x > 2(3)$$

$$\frac{-2x}{-2} > \frac{6}{-2}$$

$$x < -3$$



$$\textcircled{2} -2.6a + 14.6 > -5.2 + 1.8a$$

$$-2.6a - 1.8a > -5.2 - 14.6$$

$$\frac{-4.4a}{-4.4} > \frac{-19.8}{-4.4}$$

$$a < 4.5$$

$$\textcircled{3} 4a - 5 \geq a + 2$$

$$4a - a \geq 2 + 5$$

$$\frac{3a}{3} \geq \frac{7}{3}$$

$$a \geq \frac{7}{3}$$

$$a \geq 2\frac{1}{3}$$

$$a \geq 2.\bar{3}$$

€ Using an Inequality to model and  
Solve a problem

Example: pg. 304

a)  $r = \text{rides}$

$$1.25 + 0.75r \leq 10.25$$

b)

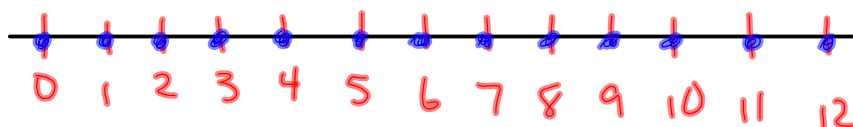
$$0.75r \leq 10.25 - 1.25$$

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

$$r \leq 12$$

Ham can go on 12 rides or less.

c)



Complete: pg 305-306

#'s: 3, 4, 5, 7-13, 16 a, b.

\* note:

$$2(3+a) \leq 5(a-4)$$

$$6+2a \leq 5a-20$$