Section 6.5 - Solving Linear Inequalities by using Multiplication & Division

To solve an inequality, we use the same strategy as for solving an equation...

However...when we multiply or divide by a negative number, we reverse the inequality sign.

ie: $-2n > 16$

$$\frac{-2n}{-2} < \frac{16}{-2}$$

$$n < -8$$

ıe inequality sign changes to its
ɔposite, when you multiply or divide by a
..egative number

One-Step Inequality

ex: Solve and graph the following...

$$5x \le 25$$

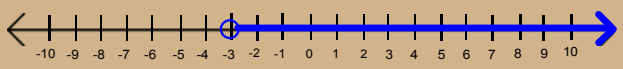
$$\frac{5x}{5} \le \frac{25}{5}$$

$$x \le 5$$

$$7a > -21$$

$$\frac{7a}{7} > \frac{-21}{7}$$

$$a > -3$$



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

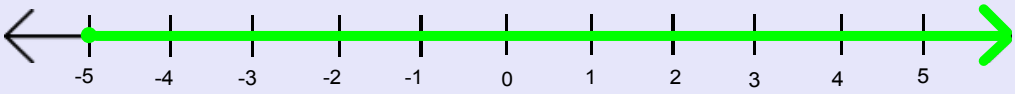
$$4\left(\frac{x}{4}\right) \ge 4(-3)$$

$$x \ge -12$$

$$-5a \leq 25$$

$$\frac{-5a}{-5} \geq \frac{25}{-5}$$ As you divide each side by -5, reverse the inequality sign

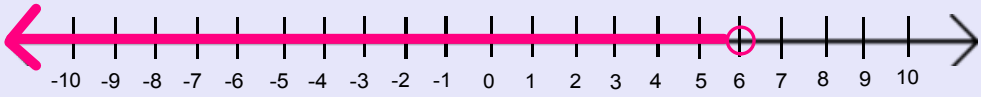
$$a \geq -5$$



$$\frac{k}{-3} > -2$$

$$-3\left(\frac{k}{-3}\right) < -3(-2)$$

$$k < 6$$



Multi-Step Inequalities

ex: Solve and Graph

a) $2x + 3 \geq 11$

$-3 \quad -3$

$2x \geq 8$

$\frac{2x}{2} \geq \frac{8}{2}$

$x \geq 4$

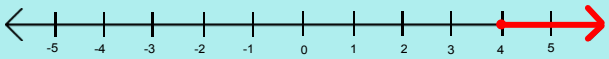
Is -3 a solution???
To verify, substitute -3 into the original inequality...

$2x + 3 \geq 11$

$2(-3) + 3 \geq 11$

$-6 + 3 \geq 11$

$-3 \not\geq 11$ Therefore, -3 is not a solution



b) $4 - 2p > 7$

$-4 \quad -4$

$-2p > 3$

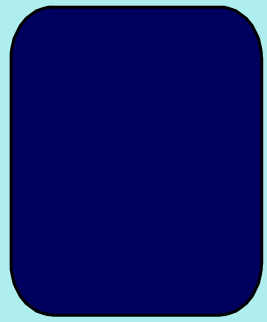
$\frac{-2p}{-2} < \frac{3}{-2}$

$p < -1.5$

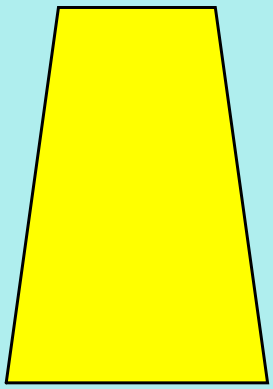
The solution set includes all numbers less than -1.5. Some examples could be...

{-3,8, -10, -5, -1.7}

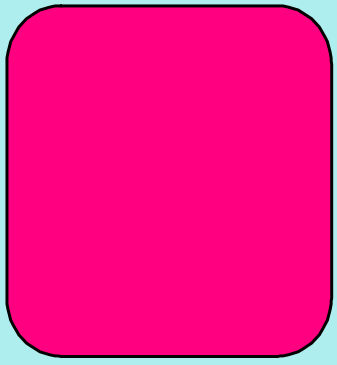
c) $4.7x - 9 \geq 11 - 1.3x$



d) $1 + \frac{3}{4}x > 17$



e) $-4(2x - 1.5) \leq -2(2 + 1.2x)$



Using an Inequality to Model and Solve a Problem

ex: The cost to rent a hall during prom is $400, plus $30 per person for the meal. The prom committee only has $10 000. How many students can attend?

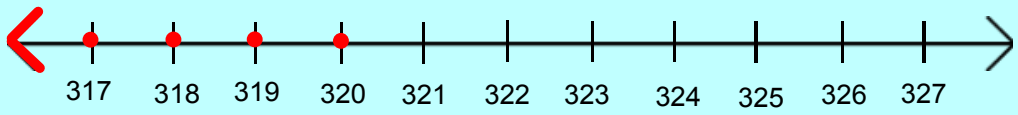
a) Define a variable and write an inequality to model the problem.

$$400 + 30p \leq 10000$$

b) Solve, then graph

$$\begin{aligned} 400 + 30p &\leq 10000 \\ -400 \qquad & -400 \\ 30p &\leq 9600 \\ \frac{30p}{30} &\leq \frac{9600}{30} \\ p &\leq 320 \end{aligned}$$

Therefore, the number of people who could attend has to be 320 or less



Why is the line not shaded???

Ex: A rental car company charges $24.95 per day, plus 0.35 per km. A business person is allowed $50 each day for travel expenses, how far can he/she travel without exceeding his/her budget?

a) Define a variable and write an inequality.

Let k = #kms

$$24.95 + 0.35k \leq 50.00$$
$$-24.95 \qquad -24.95$$
$$0.35k \leq 25.05$$
$$\frac{0.35k}{0.35} \leq \frac{25.05}{0.35}$$
$$k \leq 71.57$$

He/She can travel no farther than 71 kms to avoid exceeding his/her budget.

Text Book: p. 305, #'s 3, 4, 5, 7, 9, 10, 11, 12, 13, 16

Extra Practice #5

ChapterReview: p. 309

Chapter Test: p. 310