

CHAPTER 2 NOTES:

2.1 & 2.2: Solving Inequalities using Addition/Subtraction

When Graphing Inequalities:

$<$ $>$ open circle. ○

* arrow goes the same way the sign points

\leq \geq closed circle ●

* variable must always come first when graphing an inequality.
If not, then turn it around.

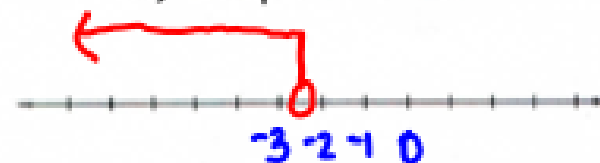
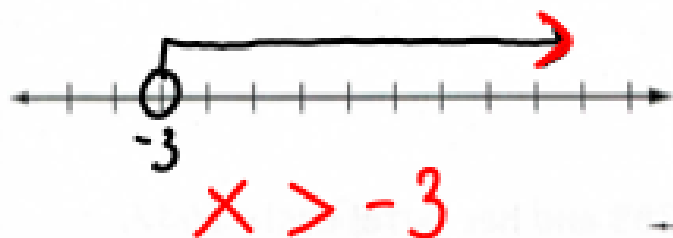
\leq No More Than
At Most

\geq No Less Than
At least

ex) Write the inequality

ex) Graph $x \geq 4$

ex) Graph $x < -2.5$



*Tell whether the value is a solution of the inequality

ex) $n=6$ $2n+9 \geq 31$

Not a
Solution

$$2(6)+9$$
$$21 \geq 31 \quad \times$$

ex) $x=-11$ $3x+20 \leq -13$

Yes, a
Solution

$$3(-11)+20$$
$$-33+20$$
$$-13 \leq -13 \quad \checkmark$$

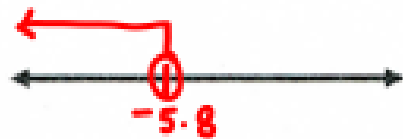
ex) $y=0$ $4y-11 < 17$

Yes, a
Solution

$$4(0)-11$$
$$-11 < 17 \quad \checkmark$$

*SOLVE: \downarrow Pretend: " \geq " = " \leq "

$$\begin{array}{r} \text{ex) } x - 9.2 < -15 \\ +9.2 \quad +9.2 \\ \hline x < -5.8 \end{array}$$

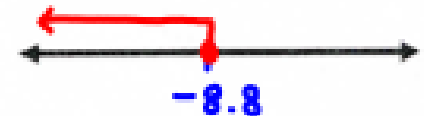


Turn the Equ. $-6+15$

$$\begin{array}{r} \text{ex) } -6 \geq a - \frac{3}{2} \rightarrow a - \frac{3}{2} \leq -6 \\ +\frac{3}{2} \quad +\frac{3}{2} \quad +\frac{3}{2} \quad +\frac{3}{2} \\ \hline -4\frac{1}{2} \geq a \\ \rightarrow a \leq -4\frac{1}{2} \end{array}$$



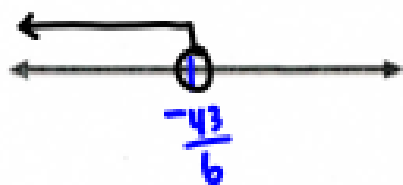
$$\begin{array}{r} \text{ex) } -2.1 \geq y + 6.7 \\ y + 6.7 \leq -2.1 \\ -6.7 \quad -6.7 \\ \hline y \leq -8.8 \end{array}$$



$$\begin{aligned} \text{ex) } x + 8\frac{1}{2} &< 1\frac{1}{3} \\ -8\frac{1}{2} \quad -8\frac{1}{2} & \\ \hline x &< -\frac{43}{6} \end{aligned}$$

$$\begin{aligned} 1\frac{1}{3} - 8\frac{1}{2} & \\ = \frac{4 \cdot 2}{3 \cdot 2} - \frac{17 \cdot 3}{2 \cdot 3} & \\ = \frac{8}{6} - \frac{51}{6} & \end{aligned}$$

$$= -\frac{43}{6}$$



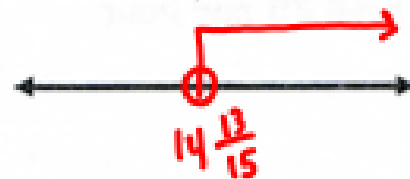
$$\begin{aligned} \text{ex) } x - 4\frac{2}{3} &> 10\frac{1}{5} \\ +4\frac{2}{3} \quad +4\frac{2}{3} & \\ \hline x &> 14\frac{13}{15} \end{aligned}$$

$$\text{Whole} + \text{whole} = 10 + 4 = 14$$

Fraction + Fraction

$$\frac{1}{5} + \frac{2}{3} = \frac{3}{15} + \frac{10}{15}$$

$$= \frac{13}{15}$$



Equation:

$$x + 23.7 + 16.9 < 52.8$$

Ex) Perimeter < 52.8

$$x + 40.6 < 52.8$$

x

23.7

$$x < 12.2$$

16.9



*SET UP & SOLVE:

ex) Mrs. Li is shopping for an I Pad. The type she wants is at least \geq \$599. So far she has saved \$374. Find the possible amounts of money she needs to save to buy the I Pad she wants.

$$\begin{array}{r} \text{Equation: } x + 374 \geq 599 \\ \underline{- 374 \quad - 374} \end{array}$$

at most $x \geq 225$

Mrs. Li needs to save

at least \$225 for the
ipad.

ex) Miss Manus saved \$2000 for a vacation. Her ticket costs \$289 and her hotel costs \$637. How much money does she have left for spending?

$$\text{Equation: } x + 289 + 637 \leq 2000$$

$$x + 926 \leq 2000$$

$$x \leq 1074$$

Miss Manus has at most
\$1074 left for spending.

*SET UP & SOLVE:

ex) A number decreased by negative 6 is at most fifteen.

$$x - (-6) \leq 15$$

$$x + 6 \leq 15 \rightarrow x \leq 9$$

ex) Seven increased by a number is no less than negative twelve

$$7 + x \geq -12$$

$$x \geq -19$$

*Define a variable & write an inequality. Then graph the solutions.

ex) Mrs. Logan's class can hold **no more than** 32 students

$$x \leq 32$$



ex) A store's employees earn **at least** \$8.25 per hour

$$x \geq 8.25$$



NOTES 2.3: Solving Inequalities using Multiplication & Division

on both sides

*KEY: When you are multiplying or dividing by a negative number you
FLIP THE INEQUALITY SIGN!!

*variable must come first to graph

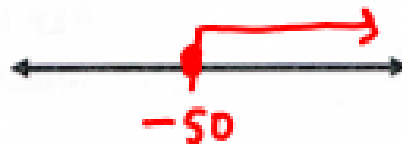
$$\text{ex) } \frac{x}{6} > -8$$

$$x > -48$$



$$\text{ex) } \frac{x}{-5} \leq 10$$

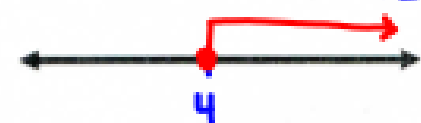
$$x \geq -50$$



$$\text{ex) } -4.8 \geq -1.2x$$

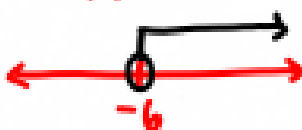
Turn the
Eqn. $\frac{-1.2x}{-1.2} \leq \frac{-4.8}{-1.2}$

Flip $x \geq 4$



$$\text{ex) } \frac{-3x}{-3} < \frac{18}{-3}$$

$$x > -6$$



$$\text{ex) } \frac{-3}{4}x < \frac{-6}{11}$$

$$\frac{-33x}{-33} < \frac{-24}{-33}$$

$$\Rightarrow x > \frac{8}{11}$$

A number line with a red circle at $\frac{8}{11}$ and an arrow pointing to the right, representing the inequality $x > \frac{8}{11}$.

$$\text{ex) } \frac{-4}{9} < \frac{2}{3}x$$

Turn Equ.

$$\frac{2}{3}x > \frac{-4}{9}$$

$$\frac{18x}{18} > \frac{-12}{18}$$

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



$$\text{ex) } \frac{-32x}{-32} \geq \frac{-4}{-32}$$

$$x \leq \frac{1}{8}$$



*Set up the inequality & solve:

ex) The product of four and x is no more than 108

$$\text{Equation: } \frac{4x}{4} \leq \frac{108}{4} \Rightarrow x \leq 27$$

ex) The quotient of p and negative five is no less than negative ten.

$$\text{Equation: } \frac{p}{-5} \geq -10 \quad (-5) \Rightarrow x \leq 50$$

↑
Flip

ex) Mr. Diaz earns \$9.25 per hour working at Dunkin Donuts. How many hours must Mr. Diaz work to earn at least \$100? \geq

$$\text{Equation: } 9.25x \geq 100$$
$$x \geq 10.8$$

Mr. Diaz must work at least 10.8 hours to earn \$100.