Algebra 1 Notes...

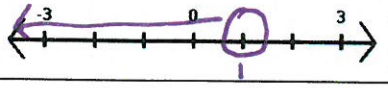
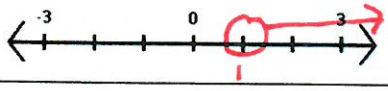
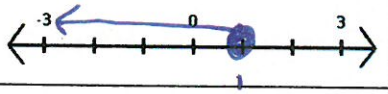
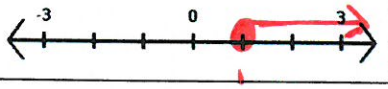
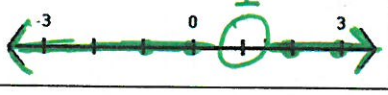
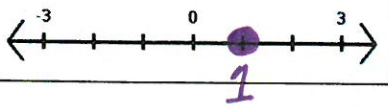
Date:_____

6.1 Solve Inequalities Using Addition and Subtraction

VOCABULARY

1) **Inequality** in one variable is the set of points that represent all solutions of the inequality. Inequalities have an INFINITE (∞) number of solutions. We use a line graph to represent their solutions.

2) **Inequality**

Symbols	Example	Graph the Inequality	Describe the solution in words
< (less than)	X < 1		X is all the numbers less than 1
> (greater than)	X > 1		X is all the numbers greater than 1
≤	X ≤ 1		X is 1 and all the numbers less than 1
≥	X ≥ 1		x is 1 and all the numbers Greater than 1
≠	X ≠ 1		1≠1 F 0≠1 T 2≠1 T -1≠1 T 3≠1 T | The solutions are all numbers except 1
=	X=1		EQUATIONS HAVE 1 SOLUTION

1) **What inequality symbol(s) use closed dots?** ≤, ≥ "● dot"

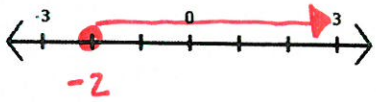
2) **What inequality symbol(s) use open dots?** <, > "○ dot"

3) Why do we rewrite inequalities **[variable] [symbol] [number] (X < 2)** & *NOT (2 > X)*?

IF we write X < 2 Then the symbol and arrow go in the same direction

Example: Graph: **-2 ≤ X**

(rewrite) X ≥ -2



Algebra 1 Notes…

VOCABULARY

3) **Equivalent inequalities** are inequalities that have the same solutions.

4) **IMPORTANT DEFINITIONS!!!** Fill in "EVALUATE" expressions;

"SOLVE" equations;

"SOLVE" **inequalities.**

EXAMPLES: Solve, Graph and Check

TIP: *Pick a number to check your solution in the original equation!!!* (x=0)

Example 1

Solve ADDITION inequality

Solve → $x + 9 < 5$

$-9 \quad -9$

$x < -4$

What is the inverse operation? Subtract

Circle solution

Solutions are all numbers less than −4.

GRAPH: → open circle at −4, shade left; 0

CHECK: x=0

0+9<5

9<5 F ☹

Example 2

Solve SUBTRACTION inequality

Solve $x - 4 \geq 2$

$+4 \quad +4$

$x \geq 6$

What is the inverse operation? addition

Circle solution

GRAPH: 1, 0, 6

CHECK: x=0

C: 0−4≥2

−4≥2 F

Example 3

Solve → $-15 \geq x - 10$

$+10 \quad +10$

$-5 \geq x$

$x \leq -5$

Rewrite:

Circle Solution

GRAPH: −10, −5, 1, 0 ☺

CHECK:

x=−10

−15 ≥ −10 + (−10)

−15 ≥ −20 ☺

Algebra 1 Notes...

Date:_____

6.2 Solve Inequalities Using Multiplication and Division

VOCABULARY

The special rule to SOLVE INEQUALTIES...

When you Multiply or Divide the VARIABLE by a NEGATIVE number you MUST Switch the direction of the INEQUALITY SYMBOL.

Multiplication Examples: Solve, Graph and Check

TIP:
Pick a number to check your solution in the original equation!!

Example 1

Solve $10x < -100$ (NOT A NEG.#)

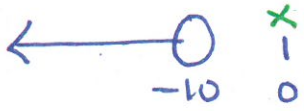
$\frac{10x}{10} < \frac{-100}{10}$

Do you switch? No

$x < -10$

Circle solution

GRAPH:



CHECK:

$x=0$ NOT A SOL.

C: $10(0) < -100$

$0 < -100$ (F)

Example 2

Mult by -4

Solve $-4x < 36$

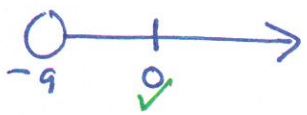
$\frac{-4x}{-4} < \frac{36}{-4}$

Do you switch? YES

$x > -9$

Circle solution

GRAPH:



CHECK:

$x=0$ SOLUTION

$-4(0) < 36$

$0 < 36$ (T)

Checks

Example 3

Solve $25 \geq -5x$

$\frac{25}{-5} \geq \frac{-5x}{-5}$

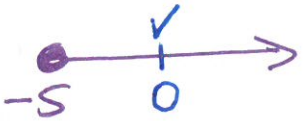
Do you switch? Yes (÷ -5)

$-5 \leq x$

Rewrite: $x \geq -5$

Circle Solution

GRAPH:



CHECK: $x=0$

C: $25 \geq -5(0)$

$25 \geq 0$ (T)

There fore "0" IS A SOLUTION; and INCLUDED IN GRAPH.

Algebra 1 Notes...

Division Examples: Solve, Graph and Check

Example 4

Solve $\frac{x}{5} \leq -6$ · 5

$x \leq -30$

Do you switch? NO

Circle solution

GRAPH:

CHECK: x=0

C: $\frac{0}{5} \leq -6$

$0 \leq -6$ (F)

"0" NOT A SOLUTION

Example 5

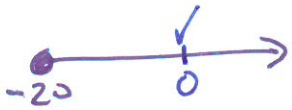
Solve $\frac{x}{-4} \leq 5 \cdot -4$

$x \geq -20$

Do you switch? YES

Circle solution

GRAPH:



CHECK: x=0

C: $\frac{0}{-4} \leq 5$

$0 \leq 5$ (T)

"0" IS A SOLUTION

Example 6

Solve $-2 \cdot 9 \leq \frac{x}{-2}$ (-2)

$-18 \geq x$

$x \leq -18$

Do you switch? YES

Rewrite:

Circle Solution

GRAPH:

CHECK: x=0

C: $9 \leq \frac{0}{-2}$

$9 \leq 0$ (F)

"0" NOT A SOLUTION

Divide by -1 Examples: Solve, Graph and Check

Example 7

Solve implied -1

$\frac{-x}{-1} > \frac{5}{-1}$

$x < -5$

Switch? YES

Circle solution

GRAPH:

Example 8

Solve implied -1

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

$3 < x$

$x > 3$

Switch? YES

Rewrite:

Circle solution

GRAPH: