

NL #2- SOLVING MULTI-STEP INEQUALITIES (Unit 3- Math 7 PLUS)

What we know...

- How do you solve multi-step equations?
 - no parentheses
 - combine like terms
 - variable one side
- How do you solve inequalities?
 - mult/div by neg switch sign

Apply what you already know and see how far you get...

Solve and graph

1) $-13n - 3 + 10n > 9$

$$\begin{array}{r} -3n + -3 > 9 \\ +3 \quad +3 \\ \hline -3n > 12 \\ \div -3 \quad \div -3 \\ \hline n < -4 \end{array}$$

$n < -4$

2) $40 < 5(-7 + 3x)$

$$\begin{array}{r} 40 < -35 + 15x \\ +35 \quad +35 \\ \hline 75 < 15x \\ \div 15 \quad \div 15 \\ \hline x > 5 \end{array}$$

$x > 5$

3) $15b + 6 > 9b - 36$

$$\begin{array}{r} -9b \quad -9b \\ 6b + 6 > -36 \\ +6 \quad +6 \\ \hline 6b > -42 \\ \div 6 \quad \div 6 \\ \hline b > -7 \end{array}$$

$b > -7$

4) $2(n - 5) \geq 30 - 8n$

$$\begin{array}{r} 2n - 10 \geq 30 - 8n \\ 10n \geq 40 \\ \div 10 \quad \div 10 \\ \hline n \geq 4 \end{array}$$

$n \geq 4$

Steps for Solving Multi-Step Inequalities

STEPS:

- 1) Get rid of parentheses
- 2) Simplify both sides of the inequality by combining like terms
- 3) Get variables to one side and constants to the other side
- 4) Solve the inequality
- 5) Graph the inequality
- 6) Check solution in the original inequality

- REMEMBER: When you multiply or divide by a negative number the inequality sign reverses (flips / switches)

TRY IT!

Solve, Graph and Check the inequality

1) $-12k + 28 < 18k + 88$

$$\begin{array}{r} -28 \quad -28 \\ -60 < 30k \\ \div 30 \quad \div 30 \\ \hline k > -2 \end{array}$$

$k > -2$

2) $11 + 2c \leq 6 - 3c$

$$\begin{array}{r} 5c \leq -5 \\ \div 5 \quad \div 5 \\ \hline c \leq -1 \end{array}$$

$c \leq -1$

$$3) -6 + k + 3k < 6$$

$$-6 + 4k < 6$$

$$4k < 12$$

$$k < 3$$



$$5) -3(x-2) \geq 3x-17+5$$

$$-3x + 6 \geq 3x - 12 + 5$$

$$-6x \geq -18$$

$$x \leq 3$$



$$4) 6x - 6 \leq 8(x+1)$$

$$6x - 6 \leq 8x + 8$$

$$-2x \leq 14$$

$$x \geq -7$$



$$6) -8 + 2c + 3 < -5c + 2$$

$$-5 + 2c < -5c + 2$$

$$7c < 7$$

$$c < 1$$



WORD PROBLEMS

Write the inequality for the word problem and solve and graph.

1. You want to buy one news paper for \$3, a souvenir for \$13, and several candy bars for \$2 each. What solution set would represent the number of candy bars you can buy if you only have \$32?

8 or less
candy bars

$$3 + 13 + 2c \leq 32$$

$$2c \leq 16$$

$$c \leq 8$$

2. 14 times a number, plus 5 is less than 11 times the same number, minus 19? What is the solution set for the number?

$$14n + 5 < 11n - 19$$

$$3n < -24$$

$$n < -8$$

3. The school Band needs a banner to carry in the parade. The banner committee decides that the length of the banner should be 18 feet. What are the possible widths of the banner if they can use no more than 48 feet of trim?

width can be perfect 100% 6



$$18(?) + 2w \leq 48$$

$$36 + 2w \leq 48$$

$$2w \leq 12$$

$$w \leq 6$$

4. Edith is counting the number of seeds in her fruit. Her pomegranate has one less than three times as many seeds as her apple. Her orange has thirteen less than five times as many seeds as her apple. If her pomegranate has more seeds than her orange, how many seeds are there in Edith's apple?

P	3a-1
a	a
O	5a-13

$$3a - 1 > 5a - 13$$

$$-2a > -12$$

$$a < 6$$

less than 6 seeds