CCSS Algebra 2 A6: Solving One-Variable Inequalities Name_____

1. How do you solve equations if they have parentheses? Write a description of how you remove the parentheses in each type of problem shown below. Divide OR Distribute

a. $\frac{3(x+1)}{3} = \frac{-12}{3}$

$x+1=-4$

$x=-5$

b. $5 - 2(x-3) = 11$

$-5 \quad -5$

$\frac{-2(x-3)}{-2} = \frac{6}{-2}$

$x-3=-3$

$+3 \quad +3$

$x=0$

c. $12 - (x+4) = -20$

$-12 \quad -12$

$\frac{-(x+4)}{-1} = \frac{-32}{-1}$

$x+4=32$

$-4 \quad -4$

$x=28$

2. How do you solve equations if they have variables (x) in different locations in the equation? Write a description of how you combine variables in each type of problem shown below. Have your x's hang out on the same side.

a. $3x - 7 = 5x + 21$

$-3x-21 \quad -3x-21$

$\frac{-28}{2} = \frac{2x}{2}$

$-14=x$

b. $4x - 2(x+3) = -10$

$4x-2x-6=-10$

$2x-6=-10$

$+6 \quad +6$

$\frac{2x}{2} = \frac{-4}{2}$

$x=-2$

c. $-2x + 5 = 3x - 25$

$+2x \quad +25 \quad +2x \quad +25$

$\frac{30}{5} = \frac{5x}{5}$

$6=x$

3. Consider the inequality: $5x+1 \geq -14$.

a. Show that $x = 4$ is a solution to the inequality.

$5(4)+1=20+1=21. \quad 21 \geq -14.$

b. Show that $x = -4$ is not a solution to the inequality.

$5(-4)+1=-20+1=-19. \quad -19 \not\geq -14$

c. Solve the equation $5x+1 = -14$ for x. Is this answer a solution to the inequality above? Explain why or why not.

$5x+1=-14$

$-1 \quad -1$

$\frac{5x}{5} = \frac{-15}{5}$

$x=-3$

Yes. $5(-3)+1=-15+1=-14$

$-14 \geq -14.$

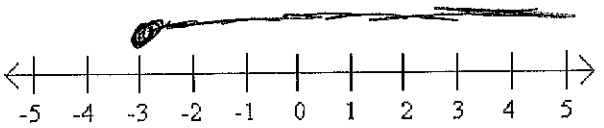
d. Explain why the solution to part (c) is the SMALLEST possible solution to the inequality $5x+1 \geq -14$.

Because if $x>-3$, then $5x+1$ is bigger.

If $x=-3$, $5x+1=-14$.

If $x<-3$, $5x+1$ is smaller than -14

e. Determine 3 three other solutions to the inequality $5x+1 \geq -14$. Mark all of the solutions you have found so far on the number line below: $x=10$, $x=100$, $x=50$,



f. Use your answer to parts (d) and (e) to show all of the solutions on the number line above. Write the solutions as an inequality.

$x \geq -3$

4. For each inequality below,
   i. Find the boundary point.
   ii. Choose and test a point.
   iii. Use the boundary point and your test point to shade the solutions on a number line.
   iv. Write the solution as an inequality (using $<, >, \leq, \geq$).

a. $10 - 3x \leq -20$

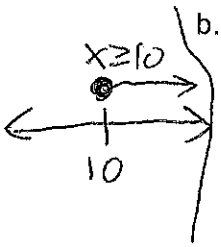
$-10 \quad -10$

$-3x \leq -30$

$\frac{-3x}{-3} \leq \frac{-30}{-3}$

$x = 10$

b.



c. $4 - 2(x+1) > 6$

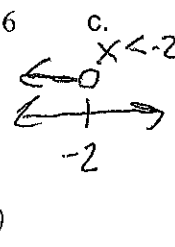
$-2(x+1) = 2$

$\frac{-2(x+1)}{-2} = \frac{2}{-2}$

$x+1 = -1$

$-1 \quad -1$

$x = -2$



$-5x + 13 < 5(2 - x)$

$-5x + 13 = 10 - 5x$

$+5x \quad +5x$

$13 = 10$

False.

No solution.

d. $1 - (2x+3) > 8$

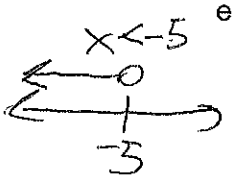
$-1 \quad -1$

$-(2x+3) = 7$

$2x+3 = -7$

$2x = -10$

$x = -5$



e. $10x - 3 \geq 7x + 3(x-1)$

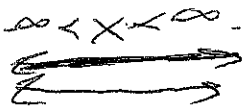
$10x - 3 = 7x + 3x - 3$

$10x - 3 = 10x - 3$

$-10x \quad -10x$

$-3 = -3$

True. All solutions



3. Mason is working during April as a salesman at a computer retail store. He is paid a flat salary of $500 plus $12 for every computer he sells. He finds that he must earn at least $1500 to pay for his April expenses. $500 + 12x \geq 1500$

a. Can Mason cover his monthly expenses if he sells 20 computers? If he sells 75 computers? Show how you found your answer.

20

$500 + 12(20) = 500 + 240 = 740$. No. Can't cover.

75

$500 + 12(75)$

$500 + 900 = 1400$. No. Can't Cover.

b. Write and solve an inequality to represent Mason's situation.

$500 + 12x \geq 1500$

$12x = 1000$

$x = \frac{1000}{12}$

$x = 83.3$

c. What does your solution tell you about Mason's job and how many computers he sells?

Mason must sell at least 83.3 computers to cover his expenses. If he sells 84 or more, he's good