Instructions on how to complete this assignment:

Solve the compound inequalities Math problems:

1. 4 ≤ 2 + 4x ≤ 16
2. x + 2 < –1 or – x ≤ 9

* Solve the compound inequalities as demonstrated in *Elementary and Intermediate Algebra*
* Show the solution sets written algebraically and as a union or intersection of intervals. Describe in words what the solution sets mean, and then display a simple line graph for each solution set. This is demonstrated in the Instructor Guidance in the left navigation toolbar, in your online course.
* Incorporate the following five math vocabulary words into your discussion. Use **bold** font to emphasize the words in your writing. Do not write definitions for the words; use them appropriately in sentences describing your math work.
  + Compound inequalities
  + And
  + Or
  + Intersection
  + Union

This is an example of how the assignment needs to be please put in own words.

One-Variable Compound Inequalities

compound inequality

and

or

intersection

union

This is my “and” compound inequality: -7 ≤ 5 + 3x ≤ 20

What that means is the inequality must fulfill two conditions at the same time. It means 5

+ 3x must be equal to or less than 20 and also at the same time greater than or equal to -

7. I think of these as “between” inequalities because it turns out that the solution set for x

will be between two numbers. Now I will find out what those two numbers are.

-7 ≤ 5 + 3x ≤ 20 Subtract 5 from all three parts of the inequality.

-7 – 5 ≤ 5 – 5 + 3x ≤ 20 – 5

-12 ≤ 3x ≤ 15 Divide all three parts by 3

-12 ≤ 3x ≤ 15

3 3 3

-4 ≤ x ≤ 5 So any value of x greater than or equal to -4 and less than

or equal to 5 will make this inequality true.

This -4 ≤ x ≤ 5 is how this compound inequality is written algebraically.

As an intersection of sets it would look like [-4, ) (- , 5] which equals [-4, 5] in

interval notation.

<----------------[-----------|---------------]--------------> Here is a number line graph of the

-4 0 5 solution set.

The square brackets mean that the end points are included in the solution set; notice the

green highlighting extends through the square brackets as well.

This is my “or” compound inequality: 4 – x ≥ 1 or 6x – 3 > 27

What this means is that there are two conditions and one of them must be true with any

given x from the solution set but both cannot be true at the same time. Since the solution

will turn out to be two disjoint intervals, I am going to solve each part of the inequality

separately.

4 – x ≥ 1 Subtract 4 from both sides.

4 – 4 – x ≥ 1 – 4

– x ≥ – 3 We must pay close attention to that negative in front of x. To

remove it I must divide both sides of the inequality by -1 which also means I must flip the

inequality symbol over so it points the other direction.

– x ≤ – 3 Symbol is flipped.

-1 -1

x ≤ 3 This is one part of my “or” compound inequality.

6x – 3 > 27 Add 3 to both sides.

6x – 3 + 3 > 27 + 3

6x > 30 Divide both sides by 6, but it is positive, so no flipping involved.

6x > 30

6 6

x > 5 This is the other part of my “or” compound inequality.

The complete solution set written algebraically is

x ≤ 3 or x > 5

The solution set written in interval notation is the union of two intervals

(- , 3] (5, )

Here is a number line graph of the solution set:

<--------------|-------]------(------------------------------>

0 3 5

Notice that the 3 is included in the solution set but 5 is not.