> Directions:
> Please only put your final, well written solutions, in the space provided.
> Give exact answers (simplified radicals or fractions).
> If you use additional paper clearly label the question and upload pages after the question page.
> Use complete sentences and explain your reason as much as possible.
> There are 4 questions and 40 points total

Name: _____

1. Jorge earns $27.50 per hour, up to 40 hours per week.

   (a) [2 points] Write a function representing Jorge's income as a function of the hours they work during the week.

   (a) _____

   (b) [1 point] What is the domain for this function?

   (b) _____

   (c) [2 points] Jorge earns "time-and-a-half" for any time worked *over* 40 hours. Write a function that represents their income if they work over 40 hours.

   (c) _____

   (d) [1 point] What is the domain for this new function of their income?

   (d) _____

   (e) [1 point] Rather than dealing with two separate calculations, create a single, piece-wise function, that represents Jorge's income as a function of hours worked:

(f) [3 points] Sketch the graph of the piecewise function. You may use a separate paper if you wish.

2. To enroll in a phone plan, you shop around various vendors and find one you like. They offer the following data plan: The initial setup fee is $100 and the first 5 gigabytes are priced at $2 per gigabyte. Any additional data is priced at $10 per gigabyte.

   (a) [4 points] What is the piecewise function that represents the cost for x gigabytes of data?

   (b) [4 points] Graph the function with an appropriate scale and indicate **all important points** such as intercepts, intersections, and cutoff values for the piecewise function. Be sure to label your axes and indicate clearly the scale.

   (c) [2 points] How much will it cost you to use 12 gigabytes of data?

   (c) _____

3. When companies make bulk purchases, it is often possible to get a reduced cost per item. A particular wholesaler of novelty pens sells their pens for $0.95 per pen on order less than 300. For orders of more than 300 pens, the price drops to $0.75 per hat.

   (a) [4 points] Express the total cost as a function of the number of pens purchased.
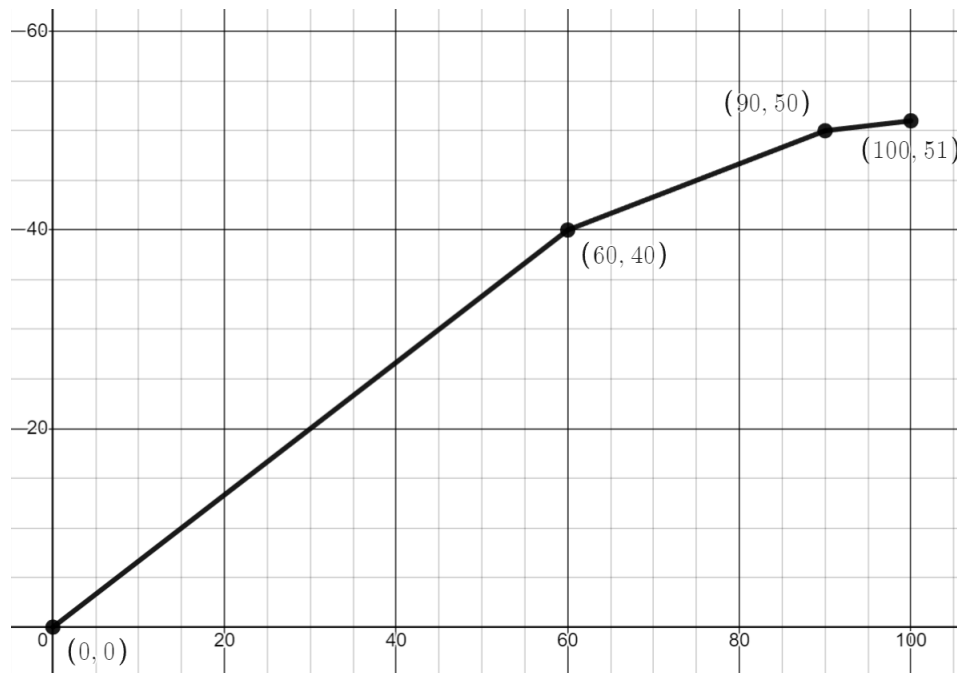
   (a) _____

   (b) [4 points] Sketch the graph of this function. You may use a separate piece of paper.

   (c) [2 points] Suppose you are making a purchase on behalf of an organization that has raised $300. What is the most amount of pens you could purchase?

   (c) _____

4. Below is the graph of a piecewise function

(a) [1 point] What is the domain of this function?

(a) _____

(b) [1 point] What is the range of this function?

(b) _____

(c) [1 point] Where is the function increasing?

(c) _____

(d) [1 point] Where is the function decreasing?

(d) _____

(e) [6 points] Write a piecewise function definition for this graph.