Math 112 Written Homework: Piecewise-linear Functions

Student Name:_____
Instructor: Laird
Math 112 Section: 062

<u>Directions</u>: Show all work, and answer each question that is asked. Explanations should be given in complete sentences. All graphs should be drawn accurately on this sheet, and be fully labeled.

1. Brody earns $15 per hour for a regular 40-hour work week. Sometimes, he works overtime and earns "time and a half" for the extra hours worked. When working for "time and a half," Brody earns 1.5 times his regular rate.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

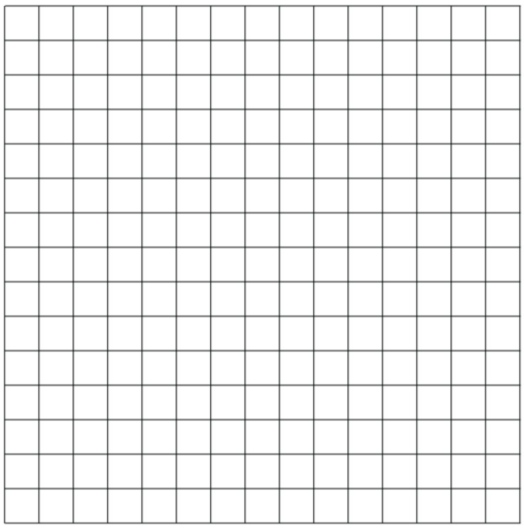
   Independent:

   Dependent:

   Create a piecewise linear function to represent the amount Brody will earn in one week based on the number of hours he works.

   What is the appropriate domain for this function? How do you know this?

   Graph this function in an appropriate window on your paper, labeling axes and scale.



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2. An online wholesaler sells novelty hats in bulk. The purple and leopard print hat sells for $3.50 each when you buy less than 25 hats. For orders of 25 or more, the price is $2.97 per hat.

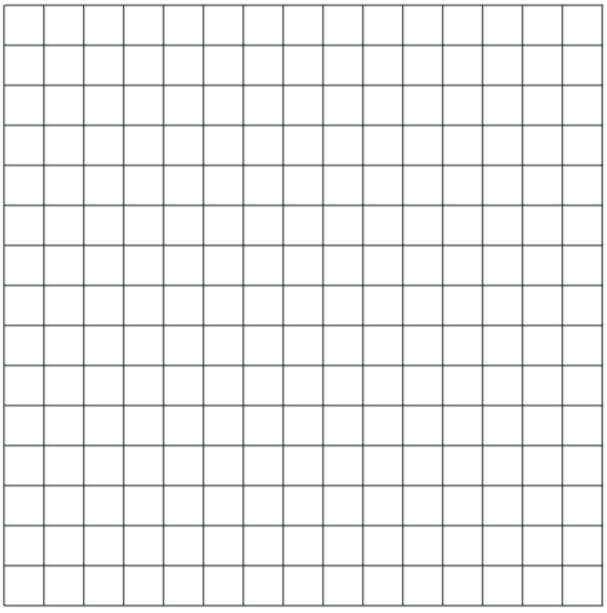
   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Express the total cost of the order as a function of the number of hats ordered.

   Graph this function in an appropriate window on your paper.



   If your group has a budget of $80 for hats, how many hats can you purchase?

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3. A university department is planning to have a local company print custom shirts for them. The quoted price for creating and printing the shirts is as follows:
    - The design and set-up fee is $35.
    - The first 75 shirts are priced at $14 each.
    - Any additional shirts are priced at $10.50 each.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Find a formula for the function that represents the total cost of ordering shirts from the company.

   How much would it cost to order 200 shirts?

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4. The following is a simplified version of the actual Arizona state tax brackets, for taxable incomes up to $24,999. For 2016, a single person whose taxable income is between $0-$10,000.00 is charged 2.59% in tax. A single person whose taxable income is between $10,000.01-$24,999.00 is charged 2.59% of the first $10,000, and 2.88% of the amount over $10,000.

   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Write a piecewise-linear function to represent the AZ state income tax for a single taxpayer as a function of taxable income, for taxable incomes up to $24,999.

   Graph this function.