Math 112 Written Homework: Piecewise-linear Functions Student Name:_____

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Math 112 Section: 010

<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. Brett earns $25 per hour for a regular 40-hour work week. Sometimes, he works overtime and earns "double time" for the extra hours worked.
   Create a piecewise linear function to represent the amount Brett will earn in one week if he works x hours.

   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.

2. An online wholesaler sells novelty hats in bulk. The purple and leopard print hat sells for $4.50 each when you buy less than 20 hats. For orders of 20 or more, the price is $3.75 per hat.

   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 $150 for hats, how many hats can you purchase?

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 $30.
    - The first 75 shirts are priced at $15 each.
    - Any additional shirts are priced at $12.50 each.

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

    How much would it cost to order 200 shirts?

4. The following is a simplified version of the actual California state tax tables, for singles taxable incomes up to $18,609. For 2017, a single person whose taxable income is between $0-$7,849 is charged 1% in tax. A single person whose taxable income is between $7,850-$18,609 is charged 1% of the first $7,849, and 2 % of the amount over $7,849. Note that these are referred to as "tax brackets".

   Write a piecewise-linear function to represent the CA state income tax for a single taxpayer as a function of taxable income, for taxable incomes up to $18,609.

   Graph this function.