Math 112 Written Homework: Linear Functions Student Name:_____

Instructor: Laird
Math 112 Section: 062

Directions: 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. A sports team is throwing an end-of-season party at the fitness club. The costs associated with the party include a $75 flat fee for the room rental, and a $14.95 per person charge for the Italian buffet. A 20% tip must be added to the cost of the food.

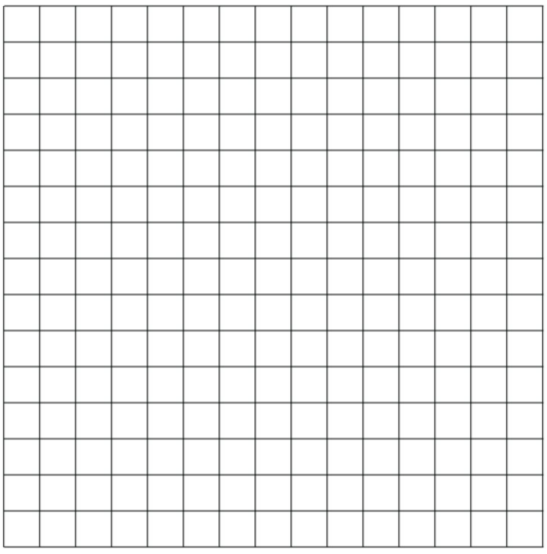
   Define the variables (make sure to include the letter you are going to use throughout the rest of the problem) :

   Independent:

   Dependent:

   Express the total cost for the party as a function of the number of people attending.

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



   If the budget for the party is $1,000, how many people can attend?

2. A solar water heater costs about $5400 to install (after rebates). A traditional gas water heater costs about $900 and costs about $400 per year to run. The average annual cost to run the solar water heater is about $80.

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

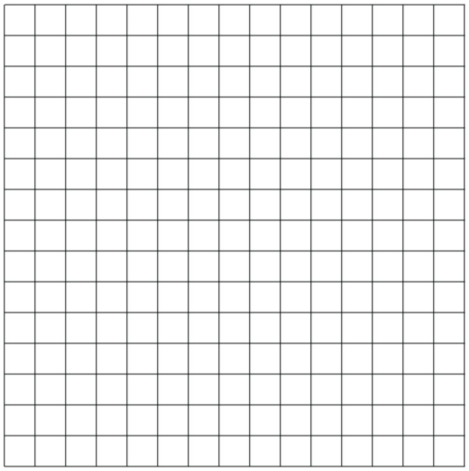
   Independent:

   Dependent:

   Create total cost functions for each of the water heaters as a function of the number of years that it is used.

Gas	Solar

   Graph these functions on the same set of axes, labeling axes and scale.



   How many years would you need to use a solar water heater in order for the total cost to become less than the total cost of the gas water heater?

3. Joaquin wants to take his phone and his video game player on a trip. An hour before they plan to leave, he realizes that he forgot to charge the batteries last night. At that point, he plugged in both devices so they can charge as long as possible before they leave. Joaquin knows that his phone has 40% of its battery life left and that the battery charges by an additional 12 percentage points every 15 minutes. His video game player is new, so Joaquin doesn't know how fast it is charging but he recorded the battery charge for the first 30 minutes after he plugged it in.

time charging (minutes)	0	10	20	30
video game player battery charge (%)	20	32	44	56

How much time would Joaquin need to charge both of the devices fully?

Video Game	Phone

4. Casie is paying off a $1500 loan by making equal payments over a 12-month period until the loan is paid.

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

   Independent:

   Dependent:

   Express the amount of debt remaining as a function of time in months.

   What is the appropriate domain for this function?

   What is the slope of the function?

   What does the slope tell you in practical terms?

   Is this function increasing or decreasing? How do you know?