Math 170 - Crickets Project

Names _____

With your partner(s), read through the instructions and do the activities described. Discuss your questions, ideas, and findings with each other. Write your results in an organized fashion on lined, blank, and/or graph paper. Staple this page to the top of your report. Only one report should be submitted from each group. This report is due Wednesday, January 11.

Over several evenings, the air temperature and the rate at which crickets were chirping was measured. The results are given in the following table.

Temperature (°F)	46	51	54	57	59	61	63	66	68	72
Chirp Rate (per min.)	40	55	72	77	90	96	99	113	127	132

1. The two numbers 46 and 40 are related and can be joined together in an ordered pair either as (46, 40) or (40, 46). The normal convention is to plot points with the first number of an ordered pair corresponding to a horizontal distance and the second number corresponding to a vertical distance. The horizontal axis corresponds to the independent variable and the vertical axis corresponds to the dependent variable. We often say that the dependent variable "depends on" the independent variable, or the independent variable "causes" the dependent variable. Write answers to the following questions. For this situation, what is the independent variable and what is the dependent variable?

2. Draw, by hand, a scatter plot of the data in the table. Use the supplied graph paper, make your graph fill most of the page, and include appropriate axes labels and title.

3. Draw a straight line that best displays the trend of the data.

4. Find the equation of the drawn straight line in the following three forms with an explanation and all steps done:
    a. Point-slope form: $y - y_0 = m(x - x_0)$ with (x_0, y_0) chosen to be central
    b. Slope-intercept form: $y = mx + b$
    c. Slope-zero form: $y = m(x - c)$

5. Write an interpretation for each of the parameters found: x_0, y_0, m, b, c

6. Your straight line is a model for this situation. Use your model to make the following predictions. Include the precision of each prediction. Write your predictions and explanations.
    a. Predict the cricket chirp rate if the temperature was 80°F.
    b. Predict the temperature if crickets are chirping at 30 chirps per minute.