Mth 111: ICA #6 – Trend lines and Linear Regression   Name: _____

Group Members: _____, _____, _____

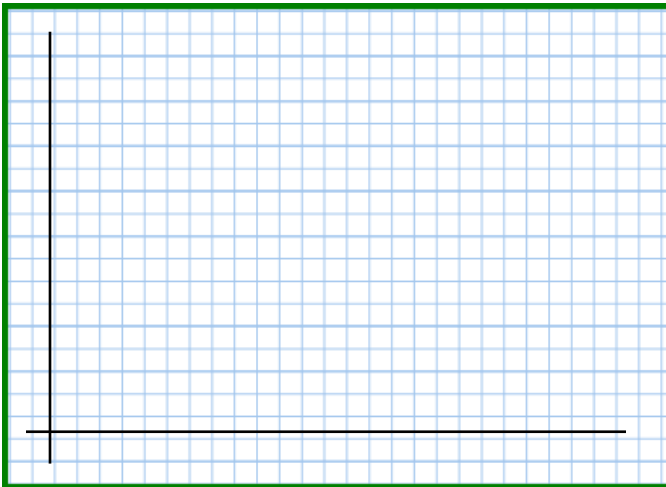A. The Experiment
   1. Define the experiment:

   2. Name the variables: Independent: _____ Dependent: _____

   3. Collect Data:

Independent								
Dependent								

B. Analyze the Experiment Using a Trendline

   1. Plot data on graph paper. Label your each axis; include units. This is a scatterplot.

   2. Look at your scatterplot. Does it have a general trend? _____

   3. Is the correlation (the trend) positive or negative?

   4. Is the correlation strong, moderate, or weak?

   5. Draw a trendline that runs "generally" through your data. It does not have to go through any particular two points.

   6. Pick two points far apart on the trendline.
           Note: These two points do <u>not</u> have to be data points.
             The coordinates of these two points should be *easy* to determine.
           Points (,   ) and (,   )

   7. Use the two points to find the equation of the trendline in slope-intercept form.

Example: If you are driving down the highway your distance function might look like: $d(t) = 60t + 224$. The slope of 60 means that for every hour you travel 60 miles. The y-intercept, 224, means that at the start of the trip I was a mile post 224.

8. Using the actual value, interpret the slope you found for your experiment.

9. Using the actual value, interpret the vertical intercept in the context of your experiment?

C. Analyze the Experiment Using Linear Regression

1. Use your calculator to find the regression line (the *best* trendline possible). Instructions for TI-83 or TI84 are in your text (Section 2.6).

2. What is your regression equation? _____

3. Use the plot feature in your calculator to make a scatterplot.

4. Graph the regression equation and scatterplot in your calculator. (Instructor_____)

5. Write a set of directions for someone to be able to use your calculator to find the regression equation.

6. Provide an example of using your regression equation to predict the dependent variable based on the value of the independent variable (x). Explain.

Regression Activities:

1. Length of signature and number of letters.
   Gather signatures and measure length and number of letters (independent)

2. Shoe length and student height (5 people of various heights)

3. Shoe length and ulna (independent) (5 people of various heights – yes heights)
4. Helicopter drop (five different heights at pendulum)
5.
6. Number of states and age (independent)
7. Bouncing T-ball : height (independent) and time to stop bouncing, height of bounce,
8. Balloon drop (height and time to land)

9. Dice (count dice, roll, toss out 6s, count dice, roll…)
10. Coin Toss (mark floor and toss coin to mark, measure distance from mark. Independent is distance from mark before toss.
11. Age of parent (independent) / age of student

1. Ask 9 students (not you) to print their name and sign as well. But, first make a data collection sheet with a place for printing and signing (see example below). Count the letters in their name and measure the length of their signature. Record data on activity sheet.

_____ 　　_____

Print 　　　　　　　　　　　　　　　　　　　　Sign

2. Ask 9 students (not you) to print their name and sign as well. But, first make a data collection sheet with a place for printing and signing (see example below). Count the letters in their name and measure the length of their signature. Record data on activity sheet.

_____ 　　_____

Print 　　　　　　　　　　　　　　　　　　　　Sign

3. Measure the shoe length and height of nine students in our class. Record data on activity sheet.

4. Measure the shoe length and height of nine students in our class. Record data on activity sheet.

5. Drop a tennis ball from several different heights (1, 3, 5, 7, 9 feet) and measure how high the ball bounces. Record data on activity sheet.

6. Drop a tennis ball from several different heights (1, 3, 5, 7, 9 feet) and measure how high the ball bounces. Record data on activity sheet.

7. Drop a tennis ball from several different heights (1, 3, 5, 7, 9 feet) and measure how long it takes to stop bouncing. Record data on activity sheet.

8. Drop a tennis ball from several different heights (1, 3, 5, 7, 9 feet) and measure how long it takes to stop bouncing. Record data on activity sheet.

9. Drop an inflated balloon from five different heights (low to high). Record the height and the time for the balloon to hit the ground. (Recommend the "pendulum" stairwell.) Record data on activity sheet.

10. Drop an inflated balloon from five different heights (low to high). Record the height and the time for the balloon to hit the ground. (Recommend the "pendulum" stairwell.) Record data on activity sheet.

11. Mark a spot on the floor in the hall. Toss a "chip" such that it stops as close as you can to the mark spot. Toss from distances of 2, 4, 6, 8, 10, 12, 15 feet away from mark. (Do a little practice first.) Record data on activity sheet.

12. Mark a spot on the floor in the hall. Toss a "chip" such that it stops as close as you can to the mark spot. Toss from distances of 2, 4, 6, 8, 10, 12, 15 feet away from mark. (Do a little practice first.) Record data on activity sheet.