Barbie Bungee   /50 points

Name:

Group Members:

Group Name:

Barbie/Ken's name:

do not lose this packet!

Fill in the Equation that best fits your data:

put a star next to model you are using for the "Big Plunge"

- manual LOBF strategy:_____

- Q Method: _____

- regression analysis (maybe…) :   _____

Any modifications you are using for final "Big Plunge" predictions record here:

It is critical that you and all of your group members understand the expectations that have been clearly laid out surrounding this lab.This is the:

Barbie/Ken Pledge

Barbie/Ken is to be treated with the utmost respect during the entire lab. This includes handling, working with and within our conversations/language. Any deviation from this can/will result in a group/individual not being able to complete the lab as well as some follow up actions. I will be respectful and respectfully support my group members. By signing below I agree to all expectations written and communicated in class.

I *insert your name here* do solemnly swear to treat Barbie/Ken with the utmost respect at all times during this lab as if it were my own child. I also fully understand how a deviation from this will be handled. : _____

Not only is this activity a lab, it is the culminating lab in this unit and it will require you and your group to utilize all we have practiced and more! This lab will culminate in a final drop, the group that is able to give Barbie/Ken the most exciting Bungee Jump will be crowned the winners (with awards!). To win this challenge starts with a group that is very attentive to detail starting now. How you collect your data is critical. You can have great mathematical modeling, but if the data you correct is flawed it may cost Barbie/Ken their life.

Order of Operations

1. Understand materials you can use
    a. butcher block paper, ruler, meter stick, writing utensils, others...
2. Establish a strategy for creating your measuring instrument and how you will record the distance Barbie/Ken is dropped accurately (writing/taking notes on the butcher block is completely acceptable). Metric units
3. Create measuring instrument
4. Establish a technique for how you will be determining the point to which Barbee has extended her drop the furthest (critical for "Big Plunge" success). Once you establish a technique and begin collecting data you cannot change your methodology without starting over. It is best to do some practice drops just to see what this is all about.
5. Record methodology below
6. Once your measuring instrument and methodology has been approved and recorded you can obtain materials and begin collecting data.
7. Materials
    a. Barbie/Ken, rubber bands, any other instrumentation that you may have deemed necessary for collecting your data
8. Begin collecting data, following the table. Three trials for each number of rubber bands (minimum). Intervals of rubber-band use are a bit up to you, at a minimum you need to go every other until you run out of room.

Roles:
*   rubber band keeper/runner (rubber bands need to be taken apart each day)
*   dropper
*   measurer
*   recorder
*   communicator

Barbie Bungee Procedure (*must be complete by all members before you begin):

Table:

# Rubber Bands	Trial 1	Trial 2	Trial 3	Mean
0				
2				

<u>Graphing and Follow Up Questions</u>

I.   Now that you have collected your data, graph it with a scatter plot
II. On the graph, manually sketch in a line of best fit.
    A. you will end up with at least 2, maybe 3 LOBF on your graph. You will need a key, each one in a different color. Be careful with showing all work on your graph so it does not get in the way of Q method work and least squares if you choose to use it

_____

III. What is the relationship between the number of rubber bands and the jump distance?

_____

V. What is the equation for your hand drawn line of best fit? (show all work)

V. What is the slope of your manually generated line of best fit. What does it represent in this context?

V. What is the y-intercept of your equation, what does it represent in this context?

VI. Generate a new line of best fit using the Q method. Show all work and use a different color on your graph to sketch this in.

VI.5 Use point slope to determine what your y-intercept is of your Q method line of best fit. Show work below.

VII. What is the equation of the line using the Q method? How does it compare to the equation you generated from the line of best fit that you manually generated?

VIII. Which method (hand drawn or q method) do you feel most accurately represents the relationship between the number of rubber bands and Barbie's jump distance? Why?

Next two questions we may not have time to get to….

IX. Your group now needs to make the decision as to which method of generating an equation that models your data you will use to predict, "the big plunge". At this point you have not been asked to use the least squares method. Have a conversation with your group members as to if you want to pursue modeling your data with this method. Below summarize your group's decision, will you be generating a mathematical model using regression? Why or Why not?

X. If you choose to try the least squares method, use the attached chart. Show all work. Create a table selecting appropriate values for x to get ordered pairs and graph. Use a different color to graph using the least squares method. Create a key on the graph.

XI. If we have time, we will take a "Practice Big Plunge". Below, write the equation you will use and show your work with modeling how many rubber bands you will be attaching

XIb. How did your group do in the "Practice Big Plunge" (be specific)? Any modifications you feel you need to make before the real "Big Plunge"?

XII. What is the equation you will be using for the, "big plunge!", show work for drop height and number rubber bands here:

Self Evaluation:

In detail, how did you positively contribute to Barbie Bungee?

In detail, what areas of group collaboration could you improve upon?

In detail, what did you learn with this lab and this unit?

How did Barbie/Ken do on the "Big Plunge", did he/she survive? Is there anything you would do differently next time so things go better? Explain.