Math 1 Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4-5 Exponential Regression – M & M Experiment** Date\_\_\_\_\_\_\_\_

* *I can create and use a line of best fit both by hand (using two points) and using technology (linear or exponential).*

# Investigation #1

1. Put 4 M & Ms into your empty cup. This number (4) is record in the table below for trial # 0 (your initial value).
2. Pour them ***gently*** onto the plate (or they’ll end up on the floor…ew).
3. Count the number that have the “M” showing. Add that number of M & Ms to the plate. Count the ***total*** number of M & Ms now on the plate. Record this data for trial #1.
4. Put the M & Ms currently on the plate back into the ***empty*** cup and continue this process five more times. If you run out of M & Ms on the last trial, just record how many M & Ms you would have put back into the cup.

# Investigation #2

1. Count all of your M & Ms and record this below as trial #0 (your initial value).
2. Put all of your M & Ms into the cup and pour them *gently* onto the plate.
3. Remove all the M & Ms with an “M” showing and put them back into the bag.
4. Count the number of ***remaining*** M & Ms back into the cup and continue the process five more times (or until you are out of M & Ms).

**Table for Investigation 1** **Table for Investigation 2**

|  |  |
| --- | --- |
| Trial Number | **REMAINING**# of M & Ms |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |

|  |  |
| --- | --- |
| Trial Number | **TOTAL**# of M & Ms |
| 0 | **4** |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |

1. Plot the scatterplots for Investigations 1 and 2 below. Be sure to choose an appropriate scale.

![[image]]()![[image]]()

 **INVESTIGATION #1 INVESTIGATION #2**

2. On your calculator, make a scatterplot of the data from investigation 1.

3. Explain why your data set from investigation 1 is not linear. Refer to what the *x* and *y* variables represent in your explanation.

4. Would a linear regression equation help you accurately predict the number of M & Ms you will have after a certain number of trials? Explain your answer.

5. Find the **exponential regression** equation using your calculator for both investigations (*Menu 4-1-A*). Write the equations below. ***Round to the nearest thousandth.***

 *Investigation 1*: 

*Investigation 2:* 

6. Graph the exponential regression equation from investigation 1 on your calculator with the scatterplot of the data from investigation 1 (*on data/statistics page – press Menu-4-6-8)*. Does the regression function seem to be a good fit? Why or why not?

7. Use your regression equation for Investigation 1 to predict the number of M & Ms after Trial 3. How close is this to your actual amount of M & Ms from the experiment? Why does this make sense?

8. Use your regression equation for Investigation 1 to predict the number of M & Ms after Trial 30.

 Do you think this is an accurate prediction? Explain.

9. Use your exponential regression equation from investigation 1 to predict how many trials it would take until you reach 10,000 M & Ms.

10. Graph the exponential regression equation from investigation 2 on your calculator with the scatterplot of the data from investigation 1. Does this function seem to be a good fit? Why or why not?

11. Use your exponential regression equations to predict the number of M & Ms for trial number 3 of Investigation 2. How close is your prediction to the actual value?

12. Use your exponential regression equation to predict the number of M & Ms for trial number 30 in Investigation 2.

13. Use your exponential regression equation for Investigation 2 to predict how many trials it will take until you have 0 M & Ms left. Explain your answer.

**OVER 🡪**

14. Based on your regression equation for Investigation 1, what percent of M & Ms did you add each trial? How does this compare to thepercent of M & Ms you would expect to add each time?

15. Based on your regression equation for Investigation 2, what percent of M & Ms did you remove each trial? How does this compare to thepercent of M & Ms you would expect to remove each time?