Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ M&M’s 4/18/16

1. Count the total number of M&Ms that you have. Record this number in trial # 0.
2. Shake the cup and dump out the M&Ms. Remove the M&Ms with the “M” showing and record the # of M&M’s left.
3. Continue this process and fill in the table. You are done when you have completed 10 phases –OR- when your M&M population gets below 4. **Do NOT record 0 as the M&M population!!!**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial #** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **# M&M** |  |  |  |  |  |  |  |  |  |  |  |

1. Graph the data points. Sketch the graph # of M&M’s Versus

representing your data. Trial Number



1. After each trial, calculate the percentage of M&M’s that landed with the imprint of “M” face up by looking at your table.

Calculate percent change for trial 1 using the formula below.

Calculate percent change for trial 2 using the formula below.

Complete the table below using the general formula for percent change:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial #** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Percent** | **X** |  |  |  |  |  |  |  |  |  |  |

1. Calculate the average of ALL the percents. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. We can also use a graphing calculator to determine which type of function fits the data best.
   1. At any time, to go to home screen: 2nd , mode
   2. Clear the calculator: 2nd , +, 7, 1, 2, enter
   3. To turn on “r squared”: 2nd , 0, (scroll down to find) DiagnosticOn, enter, enter
   4. Turn stat plot on: 2nd , y=, enter, on
   5. Go to home screen: 2nd mode
   6. Enter new data: STAT, and under EDIT choose Edit. A blank table should appear. Under L1 you are going to list the trial number and under L2 list the “# M&M”.
   7. Go to home screen: 2nd mode
   8. Graph the data: Graph, Zoom, 9.
   9. What function do you think will fit the data best? Linear, quadratic, or exponential.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. To find the “curve of best fit”: This will make an equation that best models your data:
     1. STAT, CALC, select LinReg, press ENTER. Write down the a, b, and r2. Record a and b to one decimal place. Record r2 to three decimal places.

y = \_\_\_\_\_\_\_\_\_\_ \*x + \_\_\_\_\_\_\_\_\_\_

a b

r2 = \_\_\_\_\_\_\_\_\_\_\_\_\_

* + 1. STAT, CALC, select ExpReg, press ENTER. Write down the a, b, and r2. Record a to one decimal place. Record b and r2 to three decimal places.

y = \_\_\_\_\_\_\_\_\_\_ \* (\_\_\_\_\_\_\_\_\_\_)x

a b

r2 = \_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. Enter the equations: Y=. Enter the linear equation into Y1 and the exponential equation into Y2
  2. Graph the data and the lines of best fit: graph
  3. Which line of best fit “fits” the data best? \_\_\_\_\_\_\_\_
  4. How do you know that is the line of best fit?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Exponential Decay Discussion**

y = \_\_\_\_\_\_\_\_\_\_ \* (\_\_\_\_\_\_\_\_\_\_)x

a b

r2 = \_\_\_\_\_\_\_\_\_\_\_\_\_

1. In our trial, we had number of trials and # of M&M’s. We fit that data with a model in #7,j,ii. Recopy it.
   1. In the model, what does x= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. In the model, what does y= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Explore what “*a*” means in your model.
   1. In your model, what value do you have for *a*? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. What does that seem to relate to when you consider your data? (After you discuss this, you may ask Ms. Ordway for a hint. Your eating M&M’s depend on how many hints you ask for.)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explore what “*b*” means in your model.
   1. In your model, what value do you have for *b*? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. How does this value relate to the data collection process? (Do NOT skip this, keep looking until you come up with something.) (After you discuss this, you may ask Ms. Ordway for a hint. Your eating M&M’s depend on how many hints you ask for.)

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explore the model versus actual.
   1. What does your model predict the M&M population is in the 4th Phase? \_\_\_\_\_\_\_\_\_\_\_\_\_
   2. What was your actual M&M population in the 4th Phase? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. How does the “theoretical” number compare to your actual data for the 4th phase. Are they the same? Are they similar?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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* 1. What are some reasons why your results are different? Explain.

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1. Predict what you think would happen if you combined all your group data.

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1. Combine the data from all the people in your group. Repeat Step 7 for the group data.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Trial #** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **Person 1** |  |  |  |  |  |  |  |  |  |  |  |
| **Person 2** |  |  |  |  |  |  |  |  |  |  |  |
| **Person 3** |  |  |  |  |  |  |  |  |  |  |  |
| **Person 4** |  |  |  |  |  |  |  |  |  |  |  |
| **Total M&M Population** |  |  |  |  |  |  |  |  |  |  |  |

1. Calculate the model for the entire group.

y = \_\_\_\_\_\_\_\_\_\_ \* (\_\_\_\_\_\_\_\_\_\_)x

a b

r2 = \_\_\_\_\_\_\_\_\_\_\_\_\_

1. How do the *a* and *b* values for the whole group compare to your individual *a* and *b* values?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_