Unit 5 Test: Take Home Portion Date Assigned $\qquad$ Date due $\qquad$
This is the take home portion of the test. You will be given the same questions in class to justify with a written statement. These questions are very involved and you should spend a significant amount of time justifying your results.

## Directions:

For each of the following problems solve completely and show all of your work (Please attach any additional work to this sheet to turn in).
Provide a written justification in the space provided using complete sentences:
The Stock Market in the United States is a general term for how all shares of companies are bought and sold in the United States. While there are many thousands of companies that buy and sell shares of their own company and many millions of people who purchase and sell those same shares it can be difficult to measure how well the whole "Stock Market" is doing at any one time. Over time we have developed different measures about how the Stock Market should be measured accurately but efficiently. One such method uses Indices which are collections of select stocks that represent global markets.
1.) The S\&P 500 represents a collection of 500 different stocks and how their prices change over time. The table below lists the value of the S\&P 500 at the end of each month from January 2016-March 2017. Using this data make a plot below, find the linear regression line, the quadratic regression line and the correlation coefficient of each. Write a short narrative about which line of regression is best and why. (This data is available on the website!!!!)

| Month | S\&P |
| :--- | ---: |
| 2015.01 | 2028.18 |
| 2015.02 | 2082.2 |
| 2015.03 | 2079.99 |
| 2015.04 | 2094.86 |
| 2015.05 | 2111.94 |
| 2015.06 | 2099.29 |
| 2015.07 | 2094.14 |


| Month | S\&P |
| ---: | ---: |
| 2015.08 | 2039.87 |
| 2015.09 | 1944.41 |
| 2015.1 | 2024.81 |
| 2015.11 | 2080.62 |
| 2015.12 | 2054.08 |
| 2016.01 | 1918.6 |
| 2016.02 | 1904.42 |


| Month | S\&P |
| ---: | ---: |
| 2016.03 | 2021.95 |
| 2016.04 | 2075.54 |
| 2016.05 | 2065.55 |
| 2016.06 | 2083.89 |
| 2016.07 | 2148.9 |
| 2016.08 | 2170.95 |
| 2016.09 | 2157.69 |


| Month | S\&P |
| ---: | ---: |
| 2016.1 | 2143.02 |
| 2016.11 | 2164.99 |
| 2016.12 | 2246.63 |
| 2017.01 | 2275.12 |
| 2017.02 | 2329.91 |
| 2017.03 | 2345.96 |



| Linear Model: |
| :--- |
| Correlation Coefficient: |
| Quadratic Model: |
| Correlation Coefficient: |

2.) Most major companies have a stock index ticker symbol and are listed on a major exchange such as the S\&P 500 or the Dow Jones Industrial Average. Pick a brand that is well known (such as Apple, Nike, Walmart, etc) and research its stock price for the last 2 years by month. Fill in the table below with the data that you collect. (use historical data found on finance.yahoo.com for your stock)

| Month | Stock Price |
| :--- | :--- |
| 2015.01 |  |
| 2015.02 |  |
| 2015.03 |  |
| 2015.04 |  |
| 2015.05 |  |
| 2015.06 |  |
| 2015.07 |  |


| Month | Stock Price |
| ---: | :--- |
| 2015.08 |  |
| 2015.09 |  |
| 2015.1 |  |
| 2015.11 |  |
| 2015.12 |  |
| 2016.01 |  |
| 2016.02 |  |


| Month | Stock Price |
| :--- | :--- |
| 2016.03 |  |
| 2016.04 |  |
| 2016.05 |  |
| 2016.06 |  |
| 2016.07 |  |
| 2016.08 |  |
| 2016.09 |  |


| Month | Stock Price |
| ---: | :--- |
| 2016.1 |  |
| 2016.11 |  |
| 2016.12 |  |
| 2017.01 |  |
| 2017.02 |  |
| 2017.03 |  |

a.) Using the information that you have collected find the linear and the quadratic regression models for your stock. Write a short narrative about whether this is a good time to buy the stock or not (is the stock generally increasing or decreasing) based off of your models

| Linear Model | Correlation Coefficient |
| :--- | :--- |
| Quadratic Model |  |
|  | Correlation Coefficient |

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$\qquad$
b.) Compare and contrast your stock and the S\&P 500 by plotting the price of your stock and the price of the S\&P 500 over this period of time. Get the linear model and the quadratic and correlation coefficients for each. Write a short narrative about how correlated the price of your stock and the price of the S\&P 500 is over the time period requested.

| Linear Model | Correlation Coefficient |
| :--- | :--- |
|  |  |
| Quadratic Model | Correlation Coefficient |
|  |  |

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