Liberty University Math 201 Project 3 complete solutions correct answers key

Based on Larson & Farber: sections 5.2–5.3

Go to [this website](http://www.google.com/finance/historical?q=NASDAQ:GOOG). First, set the date range to be for exactly 1 year ending with the Monday that this course started. For example, if the current term started on 04/01/2014, then use 04/01/2013 – 03/31/2014. Your dates will going back exactly 1 year. Next, click the link on the right that says *Download to Spreadsheet* and then save the file to your computer.

This project will only use the Closing Values. Assume that the closing prices of the stock form a normally distributed data set. This means that you need to use Excel to find the mean and standard deviation and then use those numbers and the methods you learned in sections 5.2 and 5.3 of our text book for Normal distributions to answer the questions.

Complete this assignment within a single Excel file. Show your work or explain how you obtained each of your answers. Answers with no work and no explanation will receive no credit.

1. If a person bought 1 share of Google stock within the last year, what is the probability that the stock on that day closed at less than the mean for that year? Hint: You do not want to calculate the mean to answer this one. The probability would be the same for any normal distribution. **(5 points)**
2. If a person bought one share of Google stock within the last year, what is the probability that the stock on that day closed at more than $600? **(5 points)**
3. If a person bought 1 share of Google stock within the last year, what is the probability that the stock on that day closed within $45 of the mean for that year? **(5 points)**
4. Suppose a person within the last year claimed to have bought Google stock at closing at $450 per share. Would such a price be considered unusual? Be sure to use the definition of unusual from our textbook. **(5 points)**
5. At what prices would Google have to close at in order for it to be considered statistically unusual? You should have a low and high value. Be sure to use the definition of unusual from our textbook that is measured as a number of standard deviations. **(5 points)**
6. What are Quartile 1, Quartile 2, and Quartile 3 in this data set? Use Excel to find these values. This is the only question that you should answer without using anything about the Normal distribution. **(5 points)**
7. Is the normality assumption that was made at the beginning valid? Why or why not? Hint: Does this distribution have the properties of a normal distribution as described in our textbook? It does not need to be perfect. Real data sets are never perfect. However, it should be close. One option would be to construct a histogram like we did in Project 1 and see if it has the right shape. If you go this route, something in the range of 10 to 12 classes would be a good number. **(5 points)**

There are also **5 points** for miscellaneous items like correct date range, correct mean, correct SD, etc.

Submit your work through the assignment link by 11:59 p.m. (ET) on Monday of Module/Week 5. Note that you must do this project on your own—you may not work with other students. You are always welcome to ask your instructor for help.

**SAMPLE**

**Project 3 instructions**

**Based on Larson & Farber: sections 5.2–5.3**

Data was exported to spread sheet from the website specified from the date range **02/02/2015 to 01/02/2016**.

The mean closing prices of Google stocks for this date range is, μ = **$618.58**.

The standard deviation of closing prices of Google stocks for this date range is, σ = **$83.1530**.

The number of days closing prices of Google stocks available for this date range is, n = **248**.

Assuming normality to the distribution of closing prices of Google stocks we have,



Complete this assignment within a single Excel file. Show your work or explain how you obtained each of your answers. Answers with no work and no explanation will receive no credit.

1. If a person bought 1 share of Google stock within the last year, what is the probability that the stock on that day closed at less than the mean for that year? Hint: You do not want to calculate the mean to answer this one. The probability would be the same for any normal distribution. **(5 points)**

**It is equivalent to obtaining the probability of the event that P (Z < 0), which is equal to 0.5 from normal areas table.**

1. If a person bought one share of Google stock within the last year, what is the probability that the stock on that day closed at more than $600? **(5 points)**

**P (X > 600) = P (Z > –0.22) = 0.5871**

1. If a person bought 1 share of Google stock within the last year, what is the probability that the stock on that day closed within $45 of the mean for that year? **(5 points)**

**P [(618.58 – 45) < X < (618.58 + 45)] = P (–0.54 < Z < 0.54)**

**= Φ (0.54) – Φ (–0.54)**

**= 0.7054 – 0.2946**

**= 0.4108**

1. Suppose a person within the last year claimed to have bought Google stock at closing at $450 per share. Would such a price be considered unusual? Be sure to use the definition of unusual from our textbook. **(5 points)**

**P (X < 450) = P (Z < –2.03) = 0.0212**

**Since 0.0212 < 0.05, Google stock at closing at $450 per share would be considered as unusual.**

1. At what prices would Google have to close at in order for it to be considered statistically unusual? You should have a low and high value. Be sure to use the definition of unusual from our textbook that is measured as a number of standard deviations. **(5 points)**

**Any closing price of Google stocks that is below 5% (< .05) or above 5% (> .05) to the distribution of closing prices of Google stocks is considered as statistically unusual. So obtain the 90% lower and upper confidence bound for the distribution to get the required cut-off points.**

**90% lower confidence bound = μ – 1.645 σ = 618.58 – 1.645 (83.1530) = 481.79**

**90% upper confidence bound = μ + 1.645 σ = 618.58 + 1.645 (83.1530) = 755.37**

1. What are Quartile 1, Quartile 2, and Quartile 3 in this data set? Use Excel to find these values. This is the only question that you should answer without using anything about the Normal distribution. **(5 points)**

**The first quartile, Q1 = μ – 0.67 σ = 618.58 – 0.67 (83.1530) = 562.87**

**The second quartile, Q2 = μ – 0 σ = 618.58 – 0 (83.1530) = 618.58 (It is the median)**

**The third quartile, Q3 = μ + 0.67 σ = 618.58 + 0.67 (83.1530) = 674.29**

1. Is the normality assumption that was made at the beginning valid? Why or why not? Hint: Does this distribution have the properties of a normal distribution as described in our textbook? It does not need to be perfect. Real data sets are never perfect. However, it should be close. One option would be to construct a histogram like we did in Project 1 and see if it has the right shape. If you go this route, something in the range of 10 to 12 classes would be a good number. **(5 points)**

**The histogram of the closing prices is as shown below:**

**The above histogram didn’t give enough evidence to the normality assumption that was made at the beginning. So distribution of closing prices of Google stocks is not normal.**

There are also **5 points** for miscellaneous items like correct date range, correct mean, correct SD, etc.

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