

## IE 522 HW01

### Q1

2 Points

Specify whether the following data are nominal, ordinal, interval or ratio:

#### Q1.1

0.5 Points

Stock prices

- ☐ Nominal
- ☐ Ordinal
- ☐ Interval
- ☒ Ratio

Save Answer

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#### Q1.2

0.5 Points

Credit scores (which are between 300 and 850)

- ☐ Ordinal
- ☒ Interval
- ☐ Nominal
- ☐ Ratio

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### Q1.3

0.5 Points

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Stock sectors (e.g., energy, utilities, healthcare, etc.)

- ☐ Ordinal
- ☒ Nominal
- ☐ Interval
- ☐ Ratio

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### Q1.4

0.5 Points

Socio economic status of mortgage applicants (low income, middle income, high income)

- ☒ Ordinal
- ☐ Ratio
- ☐ Nominal
- ☐ Interval

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## Q2

1.5 Points

The mean and standard deviation of company A's stock price are 266 and 165, respectively. The mean and standard deviation of company B's stock price are 128 and 105, respectively.

### Q2.1

0.5 Points

What's the coefficient of variation for stock price A?

0.62

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## Q2.2

0.5 Points

What's the coefficient of variation for stock price B?

0.82

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## Q2.3

0.5 Points

In terms of coefficient of variation, which stock price exhibits larger variability?

☒ Stock price B

☐ Stock price A

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## Q3

2 Points

Consider a data set {1,2,4,6,9,12}.

### Q3.1

1 Point

Compute the 0.65-quantile by using the method described on p.15 of lecture notes. Show your computational details. You can type your solution in the box or upload a file (pdf or picture). To type math on gradescope directly, see

<https://help.gradescope.com/article/3vm6obxcyf-latex-guide>.

6.75.

$n = 6$ ,  $p = 0.65$ ,  $c = p(n-1)+1 = 4.25$

$j$  is the integer part of  $c$ , which is 4.

$r$  is the decimal part of  $c$ , which is 0.25.

$X_p = (1 - r)X_4 + rX_5$ , so  $X_p$  will be  $6 * 0.75 + 9 *$

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### Q3.2

1 Point

Draw a graph as the one on p.17 to illustrate your solution. Upload a file with your solution.

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### Q4

4.5 Points

Stock prices of Tesla from 8/24/2017 to 8/23/2022 can be downloaded from canvas. Compute the daily log returns using the Adj Close prices. Finish the following questions.

#### Q4.1

0.5 Points

Estimate the mean of Tesla's daily log return. Report a decimal (not percentage) and keep 3 digits after the decimal point.

0.002

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#### Q4.2

0.5 Points

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Estimate the standard deviation of Tesla's daily log return. Report a decimal and keep 2 digits after the decimal point.

0.04

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#### Q4.3

1 Point

Estimate the correlation coefficient for Tesla's daily log return in two consecutive days. What does it say about the strength of the linear relationship between Tesla's daily log returns in two consecutive days?

-0.02552153. The linear relationship between two consecutive days is weak

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#### Q4.4

1 Point

Estimate the correlation coefficient of the adjusted close price and the volume. When the stock price is low, what tends to happen to the volume?

-0.2953522.  
If the stock price is low, the volume tends to be high (since they are negatively correlated).

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#### Q4.5

0.5 Points

Is the distribution of Tesla's daily log return skewed to the left or skewed to the right or symmetric?

- ☒ Skewed to the left
- ☐ Skewed to the right
- ☐ Symmetric

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#### Q4.6

1 Point

Estimate the kurtosis of Tesla's daily log return. How do the tails of the distribution of Tesla's daily log return compare to the tails of a normal distribution?

7.228553.

$7.228553 - 3 = \text{excess kurtosis} > 0$ . As a result, it is fatter than normal distribution.



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