

Statistics 251: Lab 1 Handout

First Name: ____Mohammad____

Last Name: ____Ramadan____

Student Number: _____74449984_____

Students should write the name they are registered with. Do not put nicknames/short forms on the handout. Please write down your answers neatly and do show your work.

Part 1

Write down the R code that you used:

- `vec1 = seq(1, 57, by = 4)`
- `vec1`

- `mat1 = matrix(vec1, ncol = 3, nrow = 5)`
- `mat1`

Part 2

1. How many variables are there in the dataset? _____5_____
2. Write down the R code that you used to calculate the mean and variance:
 - `distance = Earthquake$distance`
 - `m = mean(distance)`
 - `m`

 - `n = length(distance)`
 - `n`

 - `Deviation = (distance - m)`
 - `Deviation`

 - `numerator = sum(Deviation^2) - (sum(Deviation)^2)/n`

- $\text{varCALC} = (\text{numerator}) / (n-1)$
- varCALC

Write down the mean: 45.6 (3 sig figs). Write down the result from using $\text{var}(x)$: 3865.117.

3. Write down the R code that you used to generate the histogram.

- `accel = Earthquake$accel`
- `accel`
- `hist(accel, main = "Histogram of maximum horizontal acceleration observed")`

Describe the shape of the histogram.

- Very left-skewed
- Unimodal

Five-number summary:

Min	Q1	Median	Q3	Max
0.003	0.044	0.113	0.220	0.810

4. Write down the R code that you used to generate the side-by-side boxplots.

- `Richter = Earthquake$Richter`
- `soil = Earthquake$soil`
- `boxplot(Richter~soil, main = "Comparative Richter/Soil Box plot")`

Does the *Richter* intensity differ by *soil* type? Why?

- The *Richter* intensity does differ by *soil* type. This is because rock is more compact than soil: rock vibrates less so earthquake intensity is decreased.

5. Which type of plot did you use? _____Scatter plot_____

Write down the R code that you used to generate the plot.

- `plot(distance ~ accel, main = "Plot of Distance and Accel")`

Describe the relationship.

- When plotting “distance” against “acceleration” the relationship seems to exponentially decrease over time.
- This makes sense because when the acceleration is small the earthquake is closer to its epicenter, so the distance between the seismological measuring station and the earthquake is large. On the other hand, when the acceleration is large the earthquake is far from its epicenter, so the distance between the seismological measuring station and the earthquake is smaller.