BS2280 – Econometrics I
Homework 1: Review of Statistics

September 18, 2023

1

A survey was conducted to ask employees how long they commute to work (in minutes). The results are captured in Table 1

PID	Commuting Time
1	30
2	45
3	10
4	91
5	5
6	18
7	46

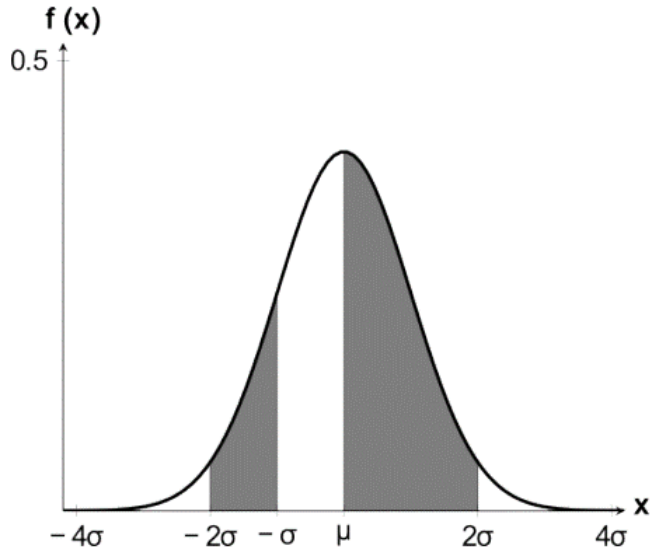
Table 1: Results of a Transport Survey

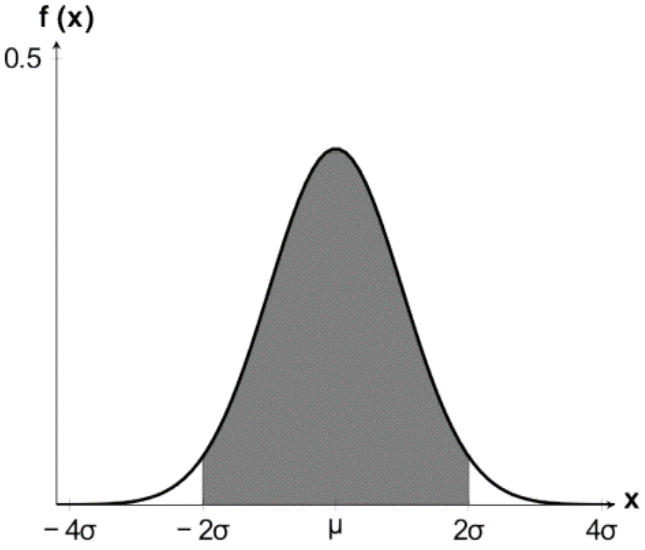
a. What is the arithmetic mean for the commuting time?

b. What is the variance and standard deviation of the commuting time?

2

Calculate the probability corresponding to the shaded area





3

R will often present its output with scientific notation, so a good understanding of scientific notation is important for interpreting regression results.

a. Write the following numbers in scientific notation:

- -0.1
- 100
- 0.000000054
- 814,502,856,329,062,153,636

b. Write the following numbers derived from R in decimal form:

- 3e01
- 3e-01
- 6.5e-09
- 5.2e05

4

A random variable X is defined to be the difference between the higher value and the lower value when two dice are thrown. If they have the same value, X is defined to be zero.

a. Find the probability distribution for X. (Hint: Use a table to identify all possible outcomes, see lecture slides on "Discrete Random Variables and Expectations ")

b. Find the expected value of X.

c. Calculate $E(X^2)$ for X.

d. Calculate the population variance and the standard deviation of X. (Hint: use $\sigma^2 = \sum (X - E(X))^2 p$ to calculate the variance)

5 *

The formula for the population variance is:

$$\sigma^2 = \frac{\sum_{i=1}^{N}(Y_i - \mu)^2}{N}$$

Show with using Summation Operator rules (see lecture slides) how this formula can be simplified to: (Hint: $\sum_{i=1}^{N} Y_i = \sum Y = N\mu$)

$$\sigma^2 = \frac{\sum_{i=1}^{N} Y_i^2}{N} - \mu^2$$