

Instructions: This portion of the exam is to be answered based on your Excel work that you completed at home. Submit this document with your answers along with the Excel file upon which the answers are based. Part II of the exam will be completed in class.

To complete this portion of the exam, you will need the Excel file **154exam1data.xlsx** also posted in Blackboard. You should perform any calculations in Excel, and then write your answers to the bolded questions directly in the Word document. You may need to copy and paste graphs here as well.

1. Using the data on Sheet 7, Calculate a complete set of descriptive statistics for car value. Report the following below.
 - a. **Mean and standard deviation.** (6 points)

mean 5908.48

st.dev. 5533.46

- b. **Five-number summary.** (10 points)

min 130

3rdQ 7717.5

1stQ. 2110

Max 33870

Median 4175

- c. **Range and mode.** (4 points)

range 33870

mode 2050

2. Using the same data on Sheet 7, make a histogram of car value. Label your graph appropriately with axis labels and a descriptive title. **Describe the shape of the graph: is it symmetric, left skewed, right skewed or some other shape?** (6 points)

Skewed right

3. Using the same data on Sheet 7, make a boxplot. **Does the boxplot support your description of the skew or symmetry above? Explain why or why not.** (6 points)

yes it agrees

mean is larger than median

larger tail is longer

outliers in larger values

4. What does the \times in the boxplot represent? (3 points)

the mean

5. On Sheet 8, the number of accidents reported on the job and their likelihood is listed. Find the weighted average of this data, treating the category greater than or equal to 9 as just 9. Report below the value you find. What is the average number of accidents reported? (6 points)

1.11

6. On Sheet 8, does the data provided represent a probability distribution? Explain your reasoning. (4 points)

yes. all values positive
and adds to 1

7. Create a simulation in Excel that will model 100 rolls of a 20-sided die whose sides are numbered 1-20. Freeze a copy of the simulation, and report the average outcome of the rolls, and the proportion of rolls that resulted in a 9. (6 points)

answers will vary, but should be somewhat similar

mean 9.77

proportion 5% = 5/100

8. The standard deviation of Income is \$26,631 for a sample of 856 incomes. Find the standard error if $SE = \frac{SD}{\sqrt{n}}$. (5 points)

9/0.23

9. The formula for the standard error for a proportion is $SE = \sqrt{\frac{p(1-p)}{n}}$. If 495 people have tried the lasagna in a sample of 856, what is the standard error for the proportion found? (5 points)

0.01688

10. The formula for the standard score is $Z = \frac{x - \mu}{\sigma}$. The mean height of women is 54" with a standard deviation of 3.1", and the mean height of men is 70" with a standard deviation of 3.5". Richard is 5'2" and Pamela is 4'11". Which of them is shorter for their gender? Explain. (8 points)

Richard is shorter

*Since he has the smallest
z-score*

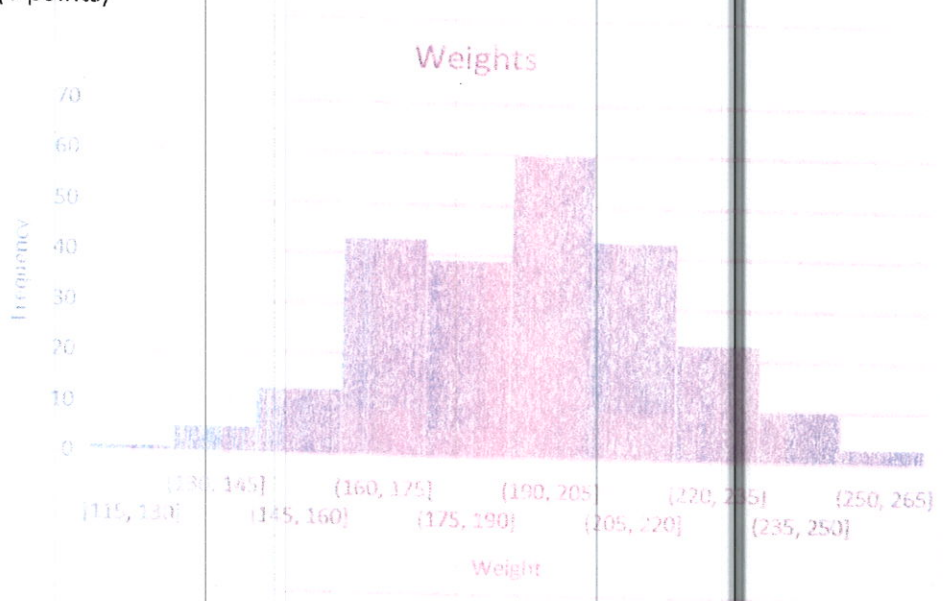
Excel Work: (20 points)

Instructions: This portion of the exam is to be answered entirely in class without Excel. You may use a calculator, but it may not be on a device that connects to the Internet. Round answers to two decimal places unless the question asks for a different number of places.

1. What does it indicate for the skewness of a histogram if the mean is lower than the median? (3 points)

possibly left-skewed

2. A sample of 240 people is taken and their weights measured. A histogram of the data is shown below. Based on the graph, describe the shape of the distribution, and state the modal class. (6 points)



modal class (190, 205] roughly symmetric

3. A 1/6 scale model of a house made of a revolutionary plastic uses 0.51 cubic meters of the new material. How much of the new material is needed for the full-size structure if the plastic is used for all of the same elements as in the model? (6 points)

$$0.51 (6)^3 = 110.16 \text{ m}^3$$

4. A boxplot comparing the ages of men and women in a sample is shown. Describe any differences you notice between the ages of men and women according to the graph. (5 points)



Slight right skew

median age of women higher

Very similar, oldest person is a man, youngest woman

5. A table of unit conversions is shown below. Use it to perform the following unit conversions. (4 points each)

Length

SI unit : meter (m)

- 1 km = 0.62137 mi
- 1 mi = 5280 ft
- = 1.6093 km
- 1 m = 1.0936 yd
- 1 in = 2.54 cm (exactly)
- 1 cm = 0.3937 in

Temperature

SI unit : kelvin (K)

0 K = -273.15°C

 = -459.67°F

K = °C + 273.15

~~°C = (5/9)(°F - 32°)~~

°F = (9/5) × °C + 32°

°C = 5/9(°F - 32°)

- a. Convert 927 miles to kilometers

$927 / 0.62137 = 1491.9 \text{ km}$

- b. Convert 927 miles to inches

$927 * 5280 * 12 = 58,734,720 \text{ in}$

- c. Convert 141°F to degrees Celsius

$C = \frac{5}{9}(141 - 32) = 60.6^\circ\text{C}$

6. The standard score for Aleyah's temperature test is $z = -2.3$. If the mean of the test is 97.4°F and has a standard deviation of 0.5°F . The observation value can be found by rearranging the standard score equation to be $x = \mu + z\sigma$. What is Aleyah's temperature according to the test? (5 points)

$$97.4 + (-2.3)(0.5) = 96.25^{\circ}$$

7. A screenshot below shows a small dataset, sample size 10. Based on the information shown, write the Excel formulas you'd need to calculate the requested values. (4 points each)

	AF	AG	AH	AI	AJ	AK
1		20				
2		22				
3		26				
4		23				
5		24				
6		18				
7		32				
8		24				
9		31				
10		28				
11						

- a. What formula would be needed to find the mean of the data?

$$= \text{AVERAGE}(AG1:AG10)$$

- b. What formula would be needed to find the sample standard deviation?

$$= \text{STDEV.S}(AG1:AG10)$$

- c. What formula would be needed to find the population standard deviation?

$$= \text{STDEV.P}(AG1:AG10)$$

8. When a standard deviation value is requested and the problem does not specify whether to calculate the sample or population standard deviation, which one should you assume? (3 points)

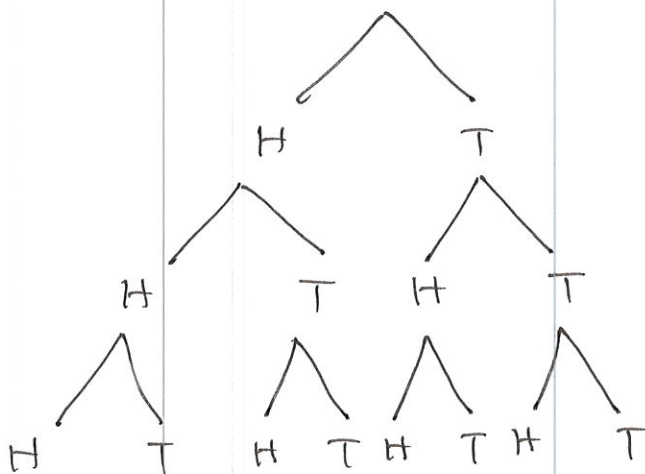
Sample

9. A probability distribution is shown below. Use it to answer the questions that follow. (3 points each)

x	0	1	2	3	4	5	6	7
$p(x)$	4%	11%	31%	8%	19%	11%	9%	7%

- a. $P(x = 3)$ 8%
- b. $P(x < 2)$ 15%
- c. $P(x \geq 5)$ 27%
- d. $P(3 < x < 6)$ 30%
- e. $P(x < 0)$ 0%
- f. $P(x \leq 1 \text{ OR } x \geq 6)$ 35%

10. Three coins are flipped and the outcome of each flip is recorded as either H or T. What are all the possible outcomes of the three flips? (6 points)



$\{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT\}$