

**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.

- Using the data on Sheet 1, write an IF statement that determines if the value in Column A is greater than 40. The outputs of the IF statement should be 1 (TRUE) or 0 (FALSE), and then use a SUM formula to count the number of values that satisfy the condition. Write your IF statement below that appears in cell B1, and the total number of values in the list that are greater than 40. (4 points)

$=IF(A1 > 40, 1, 0)$  copy 4

↓

- On Sheet 2, there is a table of values expressed in percent, decimal, fraction and scientific notation. Complete the table by filling in the missing formats so that each number appears in all four formats. **Copy the results below** (complete the table both here and in Excel). (6 points)

Percents	Decimals	Fractions	Scientific Notation
0.03%	0.003	0	3.25E-04
58%	0.58	279/481	5.8E-01
4.78%	0.0478	25/523	4.78E-02
71.3%	0.713	159/223	7.13E-01

- On Sheet 3, there is data on Pay Type and Gender. Create a Pivot Table of the data. **How many women are paid hourly?** (4 points)

186

- On Sheet 4, is a list of salaries of a particular coal miner over a period of time in the 1940s and 1950s. Calculate the percent change in Column C for all the years after the first one. **Report below the percent from 1948 to 1949.** (4 points)

0.80%

5. On Sheet 5 is data on credit card debt. Find the 30<sup>th</sup> percentile of credit card debt and report the value below. (4 points)

650

6. A loan of \$500 is taken at a charge of 8% annual interest for 6 months. Find the amount of interest paid and the total amount of money to be paid back at the end of 6 months. (6 points)

Interest paid = \$20  
Paid back = \$520

7. Using an amortization table or a built-in financial formula in Excel, find the payment owed monthly on a mortgage of \$450,000 for 30 years at 3.25% annual interest compounded monthly. (6 points)

\$1,958.43

8. Determine if the sequence of values 6.5, 7.8, 9.1, 10.4, 11.7, 13, ... represents exponential growth. If it does, state the common ratio. If it does not, explain why not. (6 points)

it does not as there is no common ratio  
the ratio changes each time

9. Make a comparative bar graph (cluster column graph) of the pivot table you made on Sheet 3. Be sure your graph is appropriately labeled and has a descriptive title. Summarize what the table means. (5 points)

answers will vary  
more people are paid salary than hourly  
more men are in both categories, but the gap  
is greater in the salary category

10. Using the data on Sheet 4, create a line graph of year and salary. Be sure that the graph is appropriately labeled. **Summarize in a sentence or two what the graph tells you.** (5 points)

*Salaries generally increased over time*

11. On Sheet 6, create a summary table of the data on Neighborhoods, and then create a pie graph of the data. Be sure that the percents are displayed on the graph and it has an appropriate title. **Which neighborhood appears to have the most residents? What percent of the data is in this neighborhood?** (5 points)

*most: West 44%*

Excel Work: (25 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. Let the universal set be the set of numbers from 0 to 10,  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ , inclusive. Let A be the set of all even numbers in U,  $A = \{0, 2, 4, 6, 8, 10\}$ , and B be the set of all numbers divisible by three in U,  $B = \{0, 3, 6, 9\}$ , and C be the set of prime numbers in U,  $C = \{2, 3, 5, 7\}$ . Use this information to answer the questions that follow.

a. How many values are in the universal set? (3 points)

11

b. How many values are in set A? (3 points)

6

c. What proportion of values in the universal set are in A? (3 points)

$\frac{6}{11}$

d. What is set  $B'$  (B-complement)? (3 points)

$\{1, 2, 4, 5, 7, 8, 10\}$

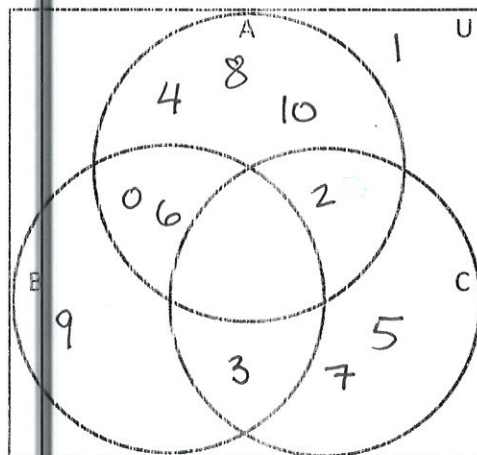
e. What elements are in  $A \cap B$ ? (3 points)

$\{0, 6\}$

f. What elements are in  $B \cup C$ ? (3 points)

$\{0, 2, 3, 5, 6, 7, 9\}$

g. A blank Venn Diagram is shown. Place the values in the appropriate sets or intersections on the diagram. (6 points)





2. Translate the logical notation below into English sentences if  $p$  is the statement "The plant is growing", and  $q$  is the statement "The bed is made". (4 points each)

a.  $\sim p$

The plant is not growing

b.  $p \vee \sim q$

The plant is growing or the bed is not made

c.  $q \rightarrow p$

If the bed is made, then the plant is growing

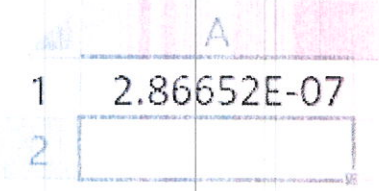
d.  $p \wedge q$

The plant is growing and the bed is made

3. Translate the logical and mathematical notation  $\exists! x(x^3 = 1 \wedge x \in \mathbb{R})$ . (6 points)

There exists a unique  $x$  such that  $x^3$  equals 1 and  $x$  is real.

4. The screenshot below shows how scientific notation appears in Excel. Write this number in standard scientific notation as it appears in normal mathematical notation and not in "computer" formatting. (4 points)



$2.86652 \times 10^{-7}$

5. The 70<sup>th</sup> percentile of heights of women in the United States is approximately 65.6" or 5'5.6". What does this statement mean in plain English? (5 points)

This means that 70% of American women are shorter than (or equal to) 5'5.6" tall.

6. Using the Screenshot below, complete the IF statement that is needed to determine if the value in the cell just to the left is Female, and outputs a 1 if TRUE, and 0 if FALSE. The formula should be such that it can be copied down the column to perform the same check on all the values in Column C. (6 points)

	C	D	E	F	G	H
Gender						
Male		=IF(				
Female		IF(logical_test, [value_if_true], [value_if_false])				
Male						
Female						
Male						
Female						
Female						
Male						

$$=IF(C2="Female", 1, 0)$$

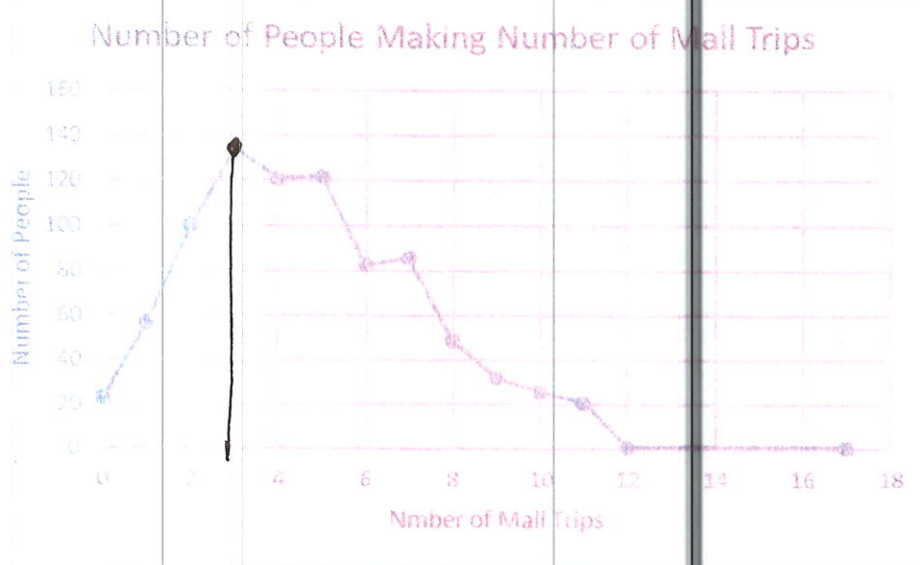
7. Using the screenshot of an Excel sheet below to write a formula that will evaluate the expression  $\frac{A-B}{C+D}$  using the cell references where the values are in the sheet. (8 points)

	A	B	C	D	Formula
4		13	16	13	8
5					

Formula assumes columns correspond to variables

$$= (A4 - B4) / (C4 + D4)$$

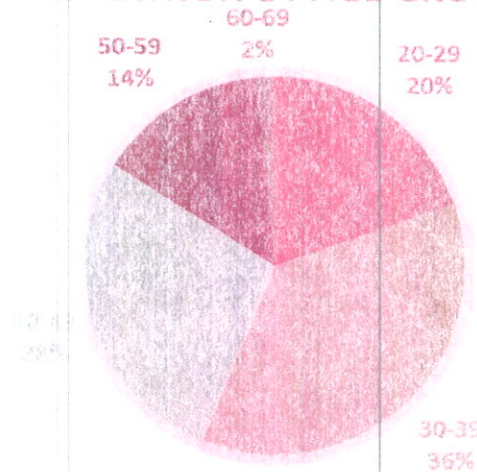
8. A line graph shows the number of people in a sample of 856 that visited the mall the corresponding number of times. Based on the graph, how many mall trips to the largest number of people make? (5 points)



The most people made 3 mall trips

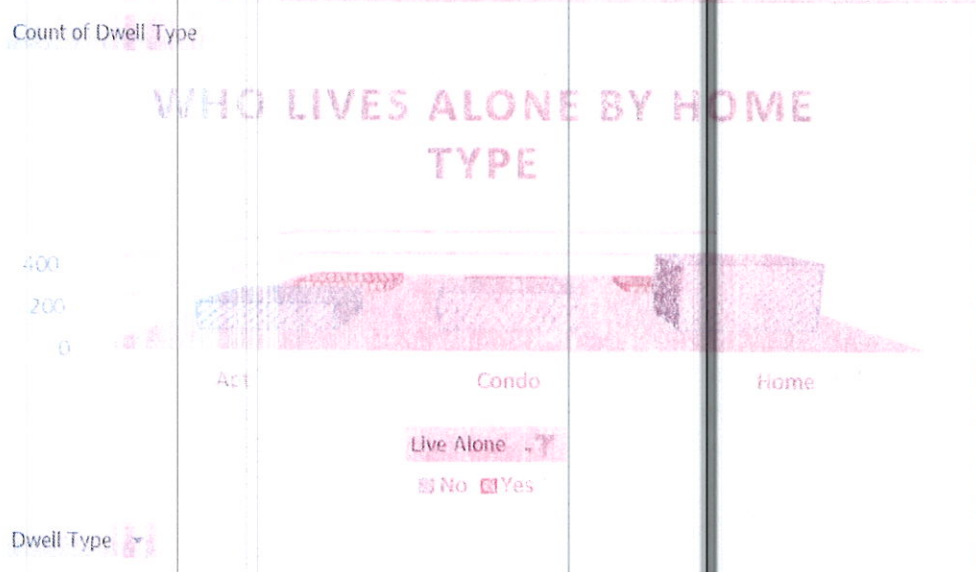
9. A pie chart of Age Groups appears below. Which age group is the smallest and which the largest in this data set? Report the corresponding percentages. (6 points)

PROPORTION BY AGE GROUPS



Smallest group: 60-69, 2%  
 largest group: 30-39, 36%

10. Below is a bar graph of who lives alone by type of home they dwell in. Is this a good graph? Why or why? Explain any positive features, and any negative features. (5 points)



This is not a good graph.  
3D graphs are hard to read.  
The shorter bars cannot be  
seen behind the taller ones  
in front.

The axes are labeled and the graph  
has a title which is descriptive