

**Instructions:** Show all work to receive full credit. You should note any formulas used or calculator functions used, their inputs and outputs, or attach a spreadsheet with your calculations. I cannot grade work if I don't know where an answer came from. Be sure complete all parts of each question, including requests for interpretation and explanations. Be as thorough as possible.

This exam will be submitted in 2 parts. Part 1 are numerical or multiple-choice responses that will be submitted separately and graded by the computer. The second part will consist of explanatory responses, working with graphs and other questions that will be submitted as scanned documents and graded by hand.

Part 1: Answer these questions using your calculator or Excel. Show your work on this page or in Excel and submit along with part 2. Then submit your answers to these questions in the Exam #1 Part 1 submission tool in Canvas.

1. On Sheet 3, there is data on Pay Type and Gender. Create a Pivot Table of the data (two-way table). **How many men are paid on salary?** (4 points)

269

2. 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 1950 to 1951.** (4 points)

4.45%

3. On Sheet 5 is data on credit card debt. **Find the 40<sup>th</sup> percentile of credit card debt and report the value below.** (4 points)

830

4. A loan of \$750 is taken at a charge of 7% annual (simple) interest for 9 months.
  - a. **Find the amount of interest paid**

\$ 39.38

- b. **Find the total amount of money to be paid back at the end of 9 months.** (6 points)

\$ 789.38

5. Using an amortization table or a built-in financial formula in Excel, find the payment owed monthly on a mortgage of \$500,000 for 30 years at 5.4% annual interest compounded monthly. (6 points)

$$\$ 2,807.65$$

6. 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)

West  
44%

7. 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 numbers  $A = \{0, 1, 3, 7, 9\}$ , and B be the set of numbers  $B = \{0, 2, 5, 8\}$ , 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)

5

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

$$\frac{5}{11}$$

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

$$\{1, 3, 4, 6, 7, 9, 10\}$$

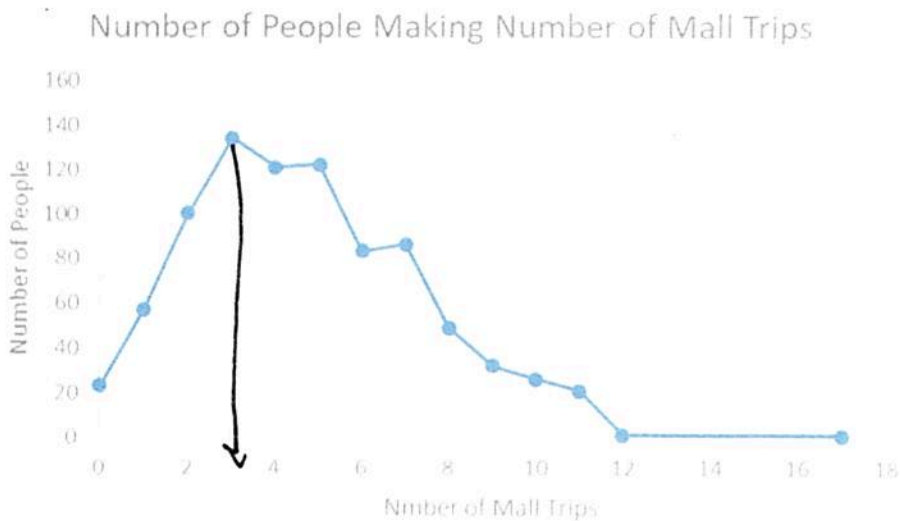
e. What elements are in  $A \cap B$ ? (3 points)

$$\{0\}$$

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

$$\{0, 2, 3, 5, 7, 8\}$$

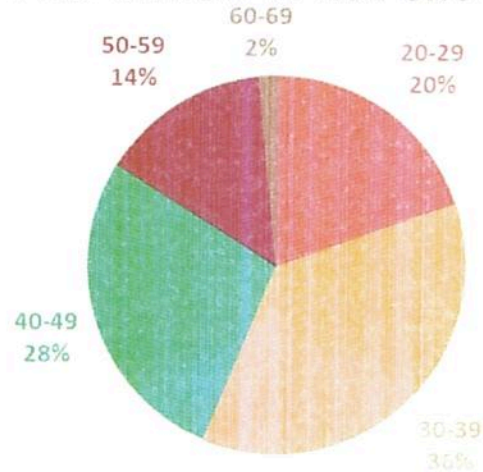
8. A line graph shows the number of people in a sample of 856 that visited the mall the corresponding number of times. Based on the graph, how many mall trips to the largest number of people make? (5 points)



3 trips (made by approx 138 people)  
±

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 60-69 → 2%  
Largest 30-39 → 36%

Part 2: Answer these questions in this file, using Excel (copy and paste solutions into this document), show work, etc. Don't make me hunt through Excel looking for answers to these questions! Submit your work for Part 1, work and solutions for Part 2, and any Excel file(s) you used to get your answers in the Final Exam Part 2 submission folder.

10. Using the data on Sheet 1 in the file **154exam1data.xlsx**, write an IF statement that determines if the value in Column A is greater than 30. 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 30.** (4 points)

$=IF(A1 > 30, 1, 0)$

4 are greater than 30

11. 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
3.26%	0.033	$\frac{10}{307}$	3.26E-02
72.85%	0.728	$\frac{381}{523}$	7.28E-01
41.80%	0.418	$\frac{209}{500}$	4.18E-01
54.2%	0.542	$\frac{271}{500}$	5.42E-01

12. 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 is not exponential. There is no common ratio*

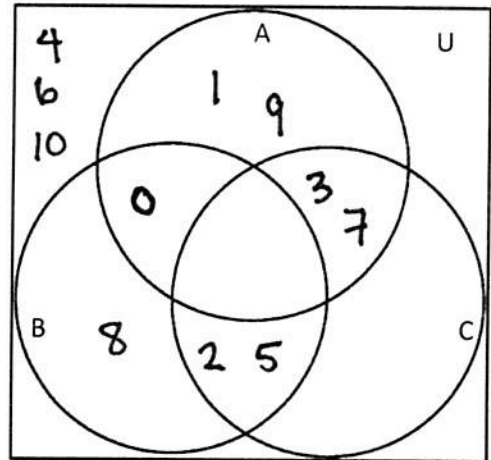
13. Make a comparative bar graph (cluster column graph) of the pivot table you made on Sheet 3. Be sure your graph is appropriately labeled and has a descriptive title. **Summarize what the table means.** (5 points)

*the number of men and women paid hourly is the same  
but more men are paid by salary*

14. 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)

*while salaries did not increase at a constant rate, they did increase every year.*

15. 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 numbers  $A = \{0, 1, 3, 7, 9\}$ , and B be the set of numbers  $B = \{0, 2, 5, 8\}$ , and C be the set of prime numbers in U,  $C = \{2, 3, 5, 7\}$ . Use this information to fill in the blank Venn Diagram is shown. Place the values in the appropriate sets or intersections on the diagram. (6 points)



16. Translate the logical notation below into English sentences if  $p$  is the statement "Tanya is reading", and  $q$  is the statement "The soil is dry". (4 points each)

a.  $\sim p$

Tanya is not reading

b.  $p \vee \sim q$

Tanya is reading or The Soil is not dry.

c.  $q \rightarrow p$

If the soil is dry, Tanya is reading.

d.  $p \wedge q$

Tanya is reading and The soil is dry.

17. Translate the logical and mathematical notation  $\exists x(x^2 = 1 \wedge x \in R)$ . Then find the value or values of  $x$  if they exist. (6 points)

There exists at least one  $x$  such that  $x^2 = 1$  and  $x$  is real.

$$x = 1, -1$$

18. 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. Use all the available decimal places. (4 points)

	A
1	2.86652E-07
2	

$$2.86652 \times 10^{-7}$$

19. 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)

70% of women are shorter than 65.6"

20. Using the Screenshot below, complete the IF statement that is needed to determine if the value in the cell just to the left is Male, 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)

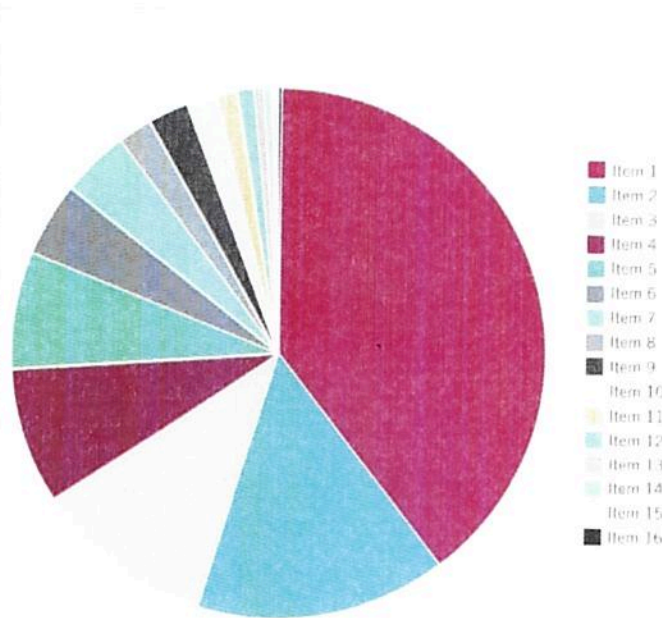
	C	D	E	F	G	H
<b>Gender</b>						
Male		=IF(C1="Male", 1, 0)				
Female		IF(logical_test, [value_if_true], [value_if_false])				
Male						
Female						
Male						
Female						
Female						
Male						

21. Using the screenshot of an Excel sheet below to write a formula that will evaluate the expression  $\frac{A-D}{C+B}$  using the cell references where the values are in the sheet.  
 Note: I don't want a number, I want to formula using cell references that can correctly calculate the value. (8 points)

3	A	B	C	D	Formula
4		13	16	13	8
5					

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

22. Below is a pie chart of some data from the Harvard Business Review. Is this a good graph? Why or why? Explain any positive features, and any negative features. There are at least 4 problems with this graph. (5 points)



*This is not a good graph.*

- I don't know what the "items" are in the legend.
- It has no title.
- The pie slices need % on the graph.
- There are too many slices.

Excel work -- 25 points