

**Instructions:** This exam is in two parts: Part I is to be completed partly at home using the materials posted on Blackboard for Part I and you will answer questions about that work in class below; Part II is to be completed entirely in class. You may not use cell phones, and you may only access internet resources you are specifically directed to use. You may access your data file for Part I of the exam in Blackboard. You may access the data files posted to Blackboard for the Exam part II. Be sure you are using the data file that matches the exam version you are given.

Part I:

- 1. Describe the histogram created from the data in the data file for Part I. Is the distribution symmetric, skewed right, skewed left or none of these?

*the histogram is none of these*

- 2. Describe the scatterplot you created of the percent-taking and combined scores. Does there appear to be a trend in the data? Can you explain why this trend might exist?

*Yes, there does appear to be a trend in the data. As more students take the exam, the score goes down, suggesting only elite students take it in*

- 3. Report the mean and standard deviation values below. Based on your answer in #1, does the Empirical Rule apply? *Some states.*

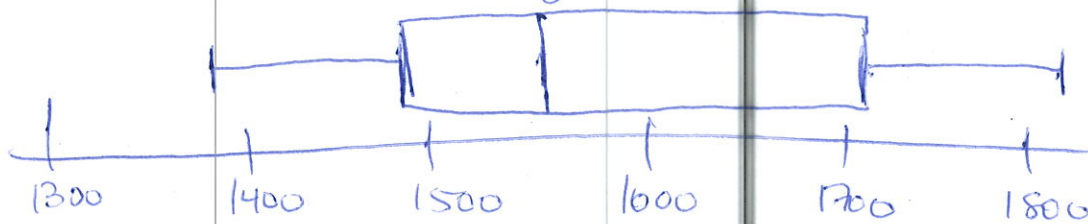
*mean 37.18%  
st. dev. 30.49%*

*no, does not apply  
since graph is not symmetric.*

- 4. Using the information you calculated on combined score, are there any outliers in the data? Use that information to sketch, by hand, a boxplot of the data below. It should be to scale. Be sure your sketch is appropriately labeled.

*no outliers*

*Box Plot of Combined SAT Scores*



*Combined SAT Scores (by state)*

Part 2:

5. Order the seven steps of the modeling process in the appropriate order. List the sequence in the column to the right.

Step	Order
Present the results to the organization.	<u>6</u>
Develop a model.	<u>3</u>
Implement model and update it over time.	<u>7</u>
Define the problem.	<u>1</u>
Verify the model.	<u>4</u>
Collect and summarize data.	<u>2</u>
Select one or more suitable decisions.	<u>5</u>

6. Categorize the following variables. Check the appropriate boxes.

Variable	Qualitative	Quantitative	Discrete	Continuous	Nominal	Ordinal	Interval	Ratio
Brand of PC	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Zip Code	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Marital Status	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Hair Color	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Yearly Rainfall		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
# of TV owned		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
Company Name	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Strokes in a golf game		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>
Amount of Tax Paid		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Party Affiliation	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			
Football Jersey #	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>			

7. What does it mean if a value represents the 70<sup>th</sup> percentile?

70% of the data falls at or below that value

8. With symmetric or bell-shaped distributions, approximately what percent of the observations are within one standard deviation of the mean?

68%

9. Expressed in percentiles, what percentile does the median represent?

50<sup>th</sup>

10. In a generic box plot, what does the "x" or "+" represent inside the box?

mean

11. A screen capture of an Excel spreadsheet is shown below. We wish to calculate the simple interest paid in Column B over one year on the principle values shown in Column A. The formula for simple interest is  $I = Pr$  for a single year. What would you need to type in Cell B4 to calculate the simple interest, so that you can copy the formula into cells B2 and B3 without having to update any cell references manually? Write the formula below.

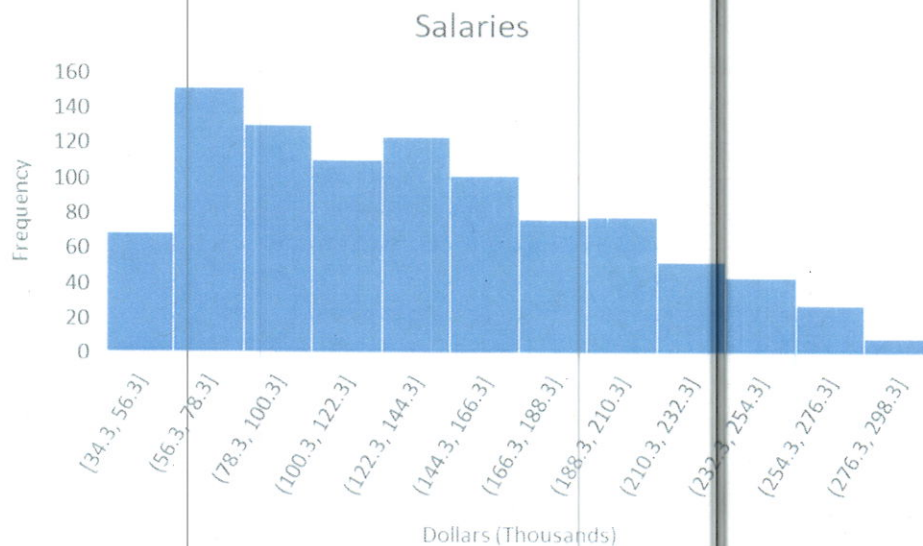
	A	B	C	D	E	F
1	Principle	Interest		Simple Interest Rate	6%	
2	45000					
3	8500					
4	11000					
5						

=A4 \* E\$1

12. Create a Time Series graph of the data in the Exam 1 data file of the 30-year interest rate values. Describe what you see. Are there any noticeable trends or events. Be thorough.

general downward trend w/ peak around 1981

13. Describe the shape of the distribution shown in the graph below.



*right skewed*

14. In the data file for the exam, use the data set on the sheet #14 to answer the following questions using the Exercise data.

a. Find the mean.

*27.597 or 27.60*

b. Find the median.

*24*

c. Does the mean and median differ by much? What does this tell you about the likely shape of the distribution?

*yes skewed right*

d. Find the interquartile range of the data.

*39.5*

e. Find the 13<sup>th</sup> percentile.

*0*

15. Gas prices for various regions in the US by state are given in the data file on sheet #15. Calculate the mean gas price by region (in italics not bold) for the years 1990, 1998, 2006 and put it in a table with years in columns, and regions of the country in rows. Use that table to create a cluster column graph of the data. Describe what you see.

gas prices were dramatically higher in all regions in 2006

lowest prices not consistent, but Pacific is regularly highest

answers will vary

16. Create a blank sheet and label it #16. Enter the following values into Excel in a table, and use it to calculate the formula. Round your answer to 4 decimal places.

$X_1$	$X_2$	$T$	$S$	$N$
99	56	2.01	3.1	26

$$\frac{T(X_2 - X_1)}{S/\sqrt{N}}$$

- 142.1640

Upload your completed Excel file to the Exam #1 submission box in Blackboard, and submit your completed paper exam to your instructor. You may not modify anything once the exam is submitted.

15. Baseball salaries for teams in the MLB are given in the data file on sheet #15. Calculate the sum of salaries for each team and put it in a table. Use that table to create a column graph of the data. Describe what you see.

*The Yankees have the highest Salaries*

*Your answers may vary*

16. Create a blank sheet and label it #16. Enter the following values into Excel in a table, and use it to calculate the formula. Round your answer to 4 decimal places.

$X_1$	$X_2$	$Z$	$S$	$N$
67	78	2.33	4.9	89

$$\frac{Z(X_1 - X_2)}{S/\sqrt{N}}$$

*- 49.3455*

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