Name _____ KEY _____

Section _____

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:

The following questions apply to problem #1 from Part I:

1. Report the mean and standard deviation of Experience. (6 points)

   Mean = 15.07
   St. dev = 8.69

2. Report the median, IQR and upper and lower fences of Experience. (8 points)

   median = 14
   IQR = 12
   Lower Fence = -9   Upper Fence = 39

3. Use this information to determine if there are any outliers in the data. If so, what are they? (5 points)

   there are. one person has 43 years experience

4. Describe the boxplot of experience. Does it appear to be skewed left, skewed right or approximately symmetric? Explain your reasoning. (4 points)

   Skewed right (larger values)
   median is below mean, large outlier

5. What does the x in the center of the box signify? (4 points)

The location of The mean

6. Consider your histograms of Age. Describe the shape of the distribution. Possible descriptions include one or more of the following: skewed left, skewed right, symmetric, normal, monomodal, bimodal, multimodal, uniform, or none of these. Do the two graphs appear to tell the same story about the data or a different one? Explain your reasoning. (10 points)

they both appear to be bimodal w/ no strong skew

the graphs are similar

7. Describe your scatterplot of Experience vs. Annual Salary. Does the data appear to have a trend? If so, is it positive or negative? (5 points)

there does appear to be a positive trend (as experience increases, so does salary) The relationship appears strong and linear

The following question relates to problem #2 from Part I:

8. Describe your time series graph. Do you notice any trends in either Manufacturing or Retail over time? Do the two variables appear to be related to each other? Explain. (8 points)

they appear stable, dip or increase at about the same time; but the gap between them is getting wider

(answers may vary)

The following questions relate to problem #3 from Part I:

9. Report the mean and median percentage on-time arrive for ~~BWI~~ CLE. Label each one clearly. (4 points)

mean CLE = 79.2

median CLE = 79.61

10. Based on your graphs, which airport has the better long-term on-time arrival percentage? Explain your reasoning based on the data. Can you think of a real-world reason as to why this might be so? (10 points)

mean and median are better for BWI
but boxplot shows that variability is also
greater; BWI has more extreme low values.
CLE gets more bad weather but is better at
dealing w/ it when it happens (answers will vary)

11. Which graphs did you choose for this data and why? Were there some graphs types you rejected? (7 points)

Cluster column to compare mean/median values
box plot for distribution comparisons

answers may vary

Calculations in Excel: (1) 48 points, (2) 15 points, (3) 30 points

15. With symmetric/bell-shaped distributions, approximately what percent of the observations are within three standard deviations of the mean? (5 points)

99.7%

16. Expressed in percentiles, what does the first quartile represent? (5 points)

25th percentile

17. A screen capture of an Excel spreadsheet is shown below. A company bases their current salary for a particular job on a simple linear formula based on a base (entry-level salary) and the number of years of experience: i.e. $y = mx + b$ where y is salary, m is the increase, and b is the base salary. The annual increase for each year of experience and the base salary are provided on the screen. What would you need to type in Cell B3 to calculate the expected salary for the given number of years' experience, so that you can copy the formula into cells B4 and B5 without having to update any cell references manually? Write the formula below. (10 points)

B3

	A	B	C	D	E	F
1	Years Experience	Salary			Each Year of Experience	$4,321
2		3 $49,712			Base Salary	$36,749
3		5				
4		22				
5		28				
6						

$= F\$1 * A3 + F\$2$

18. In the data file for the exam, use the data set on the sheet #18 to answer the following questions using the Income data.
   a. Some of the data in the column is missing. How does Excel treat those blank cells? (5 points)

   it ignores them in calculations

   b. Find and report the third quartile. (5 points)

   $177,700

   c. Find and report the minimum. (5 points)

   $34,300

   d. Find and report the sample variance and the population variance. How do they differ? (7 points)

   Sample: 3,727,117,401
   Population: 3,723,271,046 ← a bit smaller

   e. Find the 16th percentile. (5 points)

   $69,088

19. Create a blank sheet and label it #19. Enter the following values into Excel in a table, and use it to calculate the formula. Round your answer to 4 decimal places. (12 points)

X_1	X_2	Z	S	N
99	87	2.58	4.1	11

$$\frac{Z(X_1 - X_2)}{S/\sqrt{N-1}}$$

23.8791

Upload your completed Excel files (**both of them!**) to the Exam #1 **to be graded** submission box in Blackboard and submit your completed paper exam to your instructor. You may not modify anything once the exam is submitted.