

Name: _____ **Key** _____

Instructions: (a) Round your answers to four decimal places; (b) Answers to all questions should be written in complete sentences; (c) Show all details of your work for every problem.

Problem 1. (35 points) Below are the travel times in minutes of 20 randomly chosen New York workers: 5, 10, 10, 15, 15, 15, 15, 20, 20, 20, 25, 30, 30, 40, 40, 45, 60, 60, 65, 85.

- Make a stemplot for these data. Then describe this stemplot.
- Make a boxplot for these data. Are there any outliers in this data set? (Show)
- Find the mean and the standard deviation of these data.
- What kinds of distributions are best summarized by \bar{x} and s ? $\bar{x} = 31.25, s = 21.8773$

Problem 2. (20 points) One of nature's patterns connects the percent of adult birds in a colony that return from the previous year, X , and the number of new adults that join the colony, Y . Here are data for the 13 colonies of sparrowhawks.

Percent Return	74	66	81	52	73	62	52	45	62	46	60	46	38
New Adults	5	6	8	11	12	15	16	17	18	18	19	20	20

- Make a scatterplot of these data. Then describe this scatterplot. $r = -0.7485, m = -0.3040, b = 31.9343$
- Find the correlation coefficient r for these data.
- Find an equation for the line of regression for predicting Y from X . Draw this line on your scatterplot. $r^2 = 0.5603$
- What percent of observations in this scatterplot are well-explained by the line of regression?
- If the number of new birds that join a colony is 25, then what is the predicted ~~number~~ ^{percent} of adults that returned to that colony from the previous year?
- What is the residual for $x = 52$?

Problem 3. (15 points) A statistics professor claims that those students who do well during the semester, will do well on the final exam as well. After collecting data from several classes the following statistics were calculated: The pre-final exam mean and standard deviation were 280 and 30, respectively; The final exam mean and standard deviation were 75 and 8, respectively; and $r = 0.6$.

- Find an equation for the line of regression for this problem. (Do NOT sketch this line.)
- What is the predicted final exam score for a student whose pre-final exam total was 300?
- Explain in words what the slope of this regression line tells us.

Problem 4. (30 points) The height of young women aged 20 to 29 has a normal distribution with a mean of 5'4" and a standard deviation of 2.7". (1 foot = 12 inches)

- What percent of young women aged 20 to 29 are at least 5'7" tall?
- What percent of young women aged 20 to 29 are between 5'5" and 5'7" tall?
- How tall are the tallest 5% of all young women aged 20 to 29?
- In what range do the middle 98% of the heights of all young women aged 20 to 29 fall?
- Give the first and the third quartiles of the distribution of heights of young women aged 20 to 29?