

Exam 3, Feb 6, 2014

Name: _____

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Show All Work!

Part 1

A company wants to determine the relationship between the size of its sales team and total revenue. They've collected the data below from the past ten years for analysis.

Year	Sales Team	Revenue (Million \$)
2003	15	13.5
2004	18	16.3
2005	24	23.3
2006	22	24.1
2007	25	26.3
2008	29	29.3
2009	30	34.1
2010	32	32.6
2011	35	36.3
2012	38	41.5

1. Produce a scatter plot and characterize, in your own words, the relationship between the two variables.
2. Calculate the Pearson Correlation Coefficient. Show each step clearly.
3. What is the difference between **causation** and **correlation**?
4. Is there a "causal" relationship between the two variables?

Part 2

This part is **optional unless you missed the previous exam**. If you want to improve your previous exam score complete this section (it will not hurt your grade).

A private equity firm assumes that the rate of return for a proposed real estate investment is best described as a normal distribution with a mean of 12.6% and a standard deviation of 4.2%.

1. What is the probability that the investment will produce a return that is:
 - a. Greater than 18%
 - b. Less than 7%
 - c. Between 10% and 16%

2. One of the analysts in the firm believes these projections are too aggressive citing 8 recent investments that produced returns of 8%, 8.5%, 9%, 9.5%, 10%, 10.5%, 11%, and 11.5%. He also states that the population variance measure is unreliable.
 - a. Help the analyst conduct the following hypothesis test:
Ho: $\mu=12.6\%$, Ha: $\mu<12.6\%$, $\alpha=0.01$
 - b. Based on this small sample of 8 returns, produce a 90% confidence interval to estimate likely investment returns.

3. Research by electrical utility industry analysts suggests that a debt level no higher than 0.459 is optimal. A sample of 47 large electrical utilities were used to determine debt ratios in the industry with the following results: $\bar{y} = 0.485$ $s = 0.029$
Is there sufficient evidence to indicate that debt levels are too high? Test using $\alpha = .10$.