

Lab Coversheet

Regression & Correlation

Name: _____

The sample data lists the ages of six copy machines along with their monthly maintenance costs.

Age (x)	1	2	3	4	4	6
Monthly Cost (y)	62	78	70	90	93	103

1. (1 point) What is the value of the correlation coefficient, r ? 1. _____
2. (1 point) Describe the type of correlation.
3. (1 point) Interpret the correlation in the context of the data.
4. (6 points) Carry out the five steps of hypothesis testing and make a conclusion about the population correlation coefficient.
 - (a) What two statements represent your null and alternative hypotheses?
 - (b) What formula represents the standardized test statistic? (b) _____
 - (c) What is the numerical value of the standardized test statistic? (c) _____
 - (d) What value should you use for the level of significance, α ? (d) _____
 - (e) What p-value did you obtain? Round to the ten-thousandths. (e) _____
 - (f) Write a full sentence describing what conclusion (about the population correlation coefficient) you obtained through hypothesis testing.

5. (1 point) What equation represents the regression line? 5. _____
6. (5 points) Use statcrunch or excel to construct the scatter plot and sketch the regression line on it. Your graph's title must say "Scatter plot by [insert your name]" if you want any credit at all for this part. (Note this represents 20% of your lab grade.) Label both the x and y axis with the variables they represent. Staple your graph to this paper and turn it in.
7. (3 points) Use the regression line equation to predict the value of y for each x value, if meaningful.
- (a) $x = 3.5$ years (a) _____
- (b) $x = 5$ years (b) _____
- (c) $x = 25$ years (c) _____
8. (1 point) What is the value of the coefficient of determination, r^2 ? 8. _____
9. (1 point) What does this tell you about the explained variation of the data about the regression line? About the unexplained variation?
10. (5 points) Construct a 95% prediction interval for the monthly maintenance cost of a machine that is 3 years old.
- (a) What is the value of the standard error of estimate, s_e ? (a) _____
- (b) What is the value of the critical value, t_c ? (b) _____
- (c) What is the value of the margin of error, E ? (c) _____
- (d) What confidence interval estimate did you obtain? (d) _____
- (e) Interpret the results.