

Review of Introduction to Probability and Statistics

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Homework #4 (see accompanying spreadsheet for the data)

1. Below is a table of data showing the evaporation coefficient of burning fuel droplets in an engine as a function of surrounding air velocity.

x: Air Velocity (cm/s)	y: Evaporation Coefficient (mm ² /s)
20	0.18
60	0.37
100	0.35
140	0.78
180	0.56
220	0.75
260	1.18
300	1.36
340	1.17
380	1.65

- a. Calculate the mean and variance for x and y
 - b. Calculate the covariance of x and y
 - c. From the results of (a) and (b), calculate the linear regression coefficient, r
 - d. From the above results, calculate the least-squares estimates for the slope and intercept of a straight-line fit of the data
 - e. Plot the data in Excel, and use the linear trendline function to display the best fit line and equation. How does the Excel best fit line compare to your answer in part (d)
2. A random sample of 120 students from an incoming freshman college class were selected for a study to determine whether the students GPA at the end of the freshman year can be predicted from their ACT test score. Assuming a first-order (straight line) regression model is appropriate,
 - a. Obtain the least-squares estimate of the slope and intercept and state the regression function.
 - b. Plot the regression function with the data.
 - c. For an ACT score of 30, what is the expected mean freshman year GPA?
 - d. Check and discuss all assumptions that went into your least-squares regression.

Note: every statistic reported should always include a confidence interval. For this problem, use a 95% confidence interval.