

Exam

Applied Statistics

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| Problem 1 | 20 Points |
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The GPAs of all students at a large university have an approximate normal distribution with a mean of 3.02 and a standard deviation of 0.39. Find the probability that the mean GPA of a random sample of 20 students selected from this university is

1. 3.10 or higher
2. 2.90 or lower
3. 2.95 to 3.11.

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| Problem 2 | 20 Points |
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A marketing research analyst collects data for a random sample of 100 customers out of the 4000 who purchased a particular “coupon special”. The 100 people spent an average of 24.57 € in the store with a standard deviation of 6.60 €.

Using a 95 percent confidence interval, estimate

1. the mean purchase amount for all 4000 customers
2. the total euro amount of purchases by the 4000 customers.

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| Problem 3 | 30 Points |
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An insurance company is reviewing its current policy rates. When originally setting the rates they believed that the average claim was 1800 €. They are concerned that the true mean is actually higher than this, because they could potentially lose a lot of money. They randomly choose 40 claims, and calculate a sample mean of 1950 €.

Assuming that the standard deviation of all claims is 500 €, set the significance level at 5%, test to see if the insurance company should be concerned.

Problem 4**30 Points**

The following data are the monthly salaries y (in dollars) and the grade point averages x for students who obtained a bachelor's degree in business administration with a major in information systems:

| GPA | Monthly Salary |
|------------|-----------------------|
| 2.6 | 3300 |
| 3.4 | 3600 |
| 3.6 | 4000 |
| 3.2 | 3500 |
| 3.5 | 3900 |
| 2.9 | 3600 |

The estimated regression equation for these data is

$$y^* = 1790.5 + 581.1x$$

1. Compute SST , SSR , and SSE .
2. Compute and interpret the coefficients of correlation and determination. Comment on the goodness of fit.
3. Does the t test indicate a significant relationship between grade point average and monthly salary? What is your conclusion? Use $\alpha = 0.05$.