

Exam

Applied Statistics

Problem 1	20 Points
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In a highway construction zone with a posted speed limit of 40 miles per hour, the speeds of all vehicles are normally distributed with a mean of 46 mph and a standard deviation of 3 mph.

Find the probability that the mean speed of a random sample of 20 cars travelling through this construction zone is

1. more than 45 mph
2. less than 45.5 mph
3. 44.5 to 47 mph.

Problem 2	20 Points
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The following data are the times (in seconds) of eight finalists in 100-meter dash:

12.25 12.37 12.68 12.84 12.90 12.97 13.02 13.35

Assume that these times represent a random sample of times for persons who would qualify for the finals of this event, and that the population distribution of such times is normal.

Determine the 95% confidence interval for the average time in 100-meter dash finals using these data.

Problem 3	30 Points
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The mean balance of all checking accounts at a bank on December 2022 was \$850. A random sample of 55 checking accounts taken recently from this bank gave a mean balance of \$780 with a standard deviation of \$230.

Using the 1% significance level, can you conclude that the mean balance of such accounts has decreased during this period? What if the significance level is 0.025?

Problem 4**30 Points**

The following table gives information on GPAs and starting salaries (rounded to the nearest thousand dollars) of seven recent college graduates:

GPA	Starting Salary
2.90	38
3.81	48
3.20	38
2.42	35
3.94	50
2.05	31
2.25	37

The estimated regression equation for these data is

$$y^* = 14.0729 + 8.6771x$$

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 $\alpha = 0.05$.