**Note: Please round all probability answers correct to three places.**

1. A university found that 22% of its students who registered for Statistics I withdraw without completing the course. Assume that 25 students register for Statistics I.

a. Compute the probability that exactly 8 students will withdraw without completing the course.

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b. Compute the probability that fewer than 6 students will withdraw without completing the course.

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c. Compute the probability that more than 5 students will withdraw without completing the course.

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d. Compute the probability that no more than 6 students will withdraw without completing the course.

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e. Compute the probability that between 3 and 10 students will withdraw without completing the course

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f. Compute the expected number of students who will withdraw without completing the course.

2. The amount of time it takes Susie to make a pie is approximately **normally** distributed, with a mean of 32 minutes and a standard deviation of 4 minutes.

a. Compute the probability that it takes Susie more than 40 minutes to make a pie.

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b. Compute the probability that it takes Susie between 28 and 38 minutes to make a pie.

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c. Compute the probability that one day it takes Susie less than 25 minutes to make a pie.

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d. Compute the number of minutes that represent the 35th percentile ( P35).

3. The time it takes a seamstress to measure, cut, and hem a wedding dress is continuous and **uniformly distributed** between the values of 42 minutes and 57 minutes. **Determine the following:**

a. Draw the graph of this continuous uniform distribution function. (**Label both axes and include proper scales!)**

b. What is the probability that it takes between 45 and 49 minutes for a seamstress to finish the hem?

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c. What is the probability that it takes more than 47 minutes for a seamstress to finish the hem?

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d. What is the probability that it takes 48 minutes exactly for a seamstress to finish the hem?

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e. What is the mean time (expected value) for a seamstress to finish the hem?

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4. The mean hourly pay rate for employees of fast food restaurants is normally distributed with a mean of $8.50 and a standard deviation of 1.25. If a simple random sample of 25 fast food employees is chosen:

a. What is the probability that the mean of the sample, (),will be between $8.00 and $8.75?

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b. What is the probability that the mean of the sample, (), will be $8.00 or less?

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c. What is the mean of this distribution? What is the standard deviation of this distribution? (Use the correct symbols to represent these values.)

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5. A farmer wants to estimate the mean time it will take for his corn stalks to produce a mature ear of corn. He takes a sample of 12 stalks and records the number of days between planting and maturing. The data, in number of days, is: 62 68 59 85 73 78 61 82 75 79 80 71

a. What is the point estimate for the mean number of days that it takes his corn to mature?

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b. Compute the 95% confidence interval of the number of days the corn takes to mature.

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c. What is the margin of error in the confidence interval?

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d. Interpret the confidence interval from above.

6. A local hairdresser wants to estimate the percent of customers who cancel, don’t show up, or reschedule appointments. She wants to be 90% certain of her estimate, and wants to be within 2% of the actual value.

a. Compute the sample size required if she thinks that the percent is possibly 35%.

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b. Compute the sample size required if she has no idea what the percent will be.

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c. In what two ways could the hairdresser decrease the sample size needed?

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7. Speedy Rooter claims that it can unclog any drain in 15 minutes or less. If it takes longer than 15 minutes, the customer doesn’t pay for the service. The owner of Speedy Rooter wants to know if his claim is really valid. He takes a random sample of 35 drain jobs and finds that the mean time is 15.4 minutes. From past experience, it is known that the population standard deviation, σ, is about 1.4 minutes. Test the company’s claim that any drain can be unclogged in 15 minutes or less. Use a level of significance of .05. Use the p-value approach, but be sure to show all steps – hypothesis, graph, p-value, decision, and statement about the problem.

8. A random sample of 49 lunch customers was taken at a restaurant. The average amount of time the customers in the sample stayed in the restaurant was 33 minutes. From past experience, it is known that the standard deviation is 10 minutes. Construct a 95% confidence interval for the true average amount of time customers spent in the restaurant. (Show calculator command or formula)

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9. A sheriff read a report stating that nationally 28% of cars did not come to a complete stop before progressing through a stop sign. He wanted to know how the percentage in his town compared to the national average. He asked for data from fellow officers in the town, and randomly assigned them times and locations. He received reports of 850 cars passing through stop signs, with 265 of them not completely stopping. Using a .01 level of significance, use a hypothesis test to see if the sheriff’s percentage of cars that do not stop completely is different from the national average for cars not stopping at the stop signs. Use the traditional method. (List the hypotheses, draw and shade the graph, label the critical value, compute the test statistic, make your decision, and make a statement about the problem.)

10. Executives of a coal company want to determine a 95% confidence interval estimate for the average daily tonnage of coal that they mine. Assuming that the company reports state that the standard deviation of daily output is 200 tons, how many days should they sample so that the margin of error will be 39.2 tons?