MATH 225N Week 6 Statistics Quiz Solutions > Fall 2019 - All the Attempted Solutions Correct.

written by

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Question 1

A statistics professor recently graded final exams for students in her introductory statistics course. In a review of her grading, she found the mean score out of 100 points was a $\bar{x}=77$, with a margin of error of 10.

Construct a confidence interval for the mean score (out of 100 points) on the final exam.

That is correct!

Answer: (67, 87)

Question 2

A random sample of adults were asked whether they prefer reading an e-book over a printed book. The survey resulted in a sample proportion of $p'=0.14$, with a sampling standard deviation of $\sigma_{p'}=0.02$, who preferred reading an e-book.

Use the empirical rule to construct a 95% confidence interval for the true proportion of adults who prefer e-books.

That is correct!

Answer: (0.10, 0.18)

Question 3

The pages per book in a library are normally distributed with an unknown population mean. A random sample of books is taken and results in a 95% confidence interval of $(237,293)$ pages.

What is the correct interpretation of the 95% confidence interval?

That is correct!

- We estimate with 95% confidence that the sample mean is between 237 and 293 pages.
- We estimate that 95% of the time a book is selected, there will be between 237 and 293 pages.
- We estimate with 95% confidence that the true population mean is between 237 and 293 pages.

Question 4

The population standard deviation for the heights of dogs, in inches, in a city is 3.7 inches. If we want to be 95% confident that the sample mean is within 2 inches of the true population mean, what is the minimum sample size that can be taken? Round up to the nearest integer.

That is correct!

Answer: 14 dog heights

Question 5

Clarence wants to estimate the percentage of students who live more than three miles from the school. He wants to create a 98% confidence interval which has an error bound of at most 4%. How many students should be polled to create the confidence interval?

$z_{0.10}$	$z_{0.05}$	$z_{0.025}$	$z_{0.01}$	$z_{0.005}$
1.282	1.645	1.960	2.326	2.576

Use the table of values above.

That is correct!

Answer: 846 Students

Question 6

The average score of a random sample of 87 senior business majors at a university who took a certain standardized test follows a normal distribution with a standard deviation of 28. Use Excel to determine a 90% confidence interval for the mean of the population. Round your answers to two decimal places and use ascending order..

Score
516
536
462
461
519
496
517
488
521

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That is correct!

Answer: (509.30, 519.18)

Question 7

A random sample of 28 statistics tutorials was selected from the past 5 years and the percentage of students absent from each one recorded. The results are given below. Assume the percentages of students' absences are approximately normally distributed. Use Excel to estimate the mean percentage of absences per tutorial over the past 5 years with 90% confidence. Round your answers to two decimal places and use increasing order.

Number of Absences
13.9
16.4
12.3
13.2
8.4
4.4
10.3
8.8
4.8

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That is correct!

Answer: (9.22, 11.61)

Question 8

Eric is studying people's typing habits. He surveyed 525 people and asked whether they leave one space or two spaces after a period when typing. 440 people responded that they leave one space. Create a 90% confidence interval for the proportion of people who leave one space after a period.

- Round your results to four decimal places.

That is correct!

Answer: (0.8117, 0.8645)

Question 9

A sample of 27 employees for the Department of Health and Human Services has the following salaries, in thousands of dollars. Assuming normality, use Excel to find the 98% confidence interval for the true mean salary, in thousands of dollars. Round your answers to two decimal places and use increasing order.

Salary
71
70
69
65
72
69
72
72
71

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That is correct!

Answer: (69.14, 71.38)

Question 10

The population standard deviation for the heights of dogs, in inches, in a city is 3.7 inches. If we want to be 95% confident that the sample mean is within 1 inch of the true population mean, what is the minimum sample size that can be taken?

$z_{0.10}1.282z_{0.05}1.645z_{0.025}1.960z_{0.01}2.326z_{0.005}2.576$

Use the table above for the z-score, and be sure to round up to the nearest integer.

That is correct!

Answer: 53 dog heights

Question 11

A random sample of house sizes in major city has a sample mean of $\bar{x}=1204.9$ sq ft and sample standard deviation of $s=124.6$ sq ft. Use the Empirical Rule to determine the approximate percentage of house sizes that lie between $955.7$and 1454.1 sq ft.

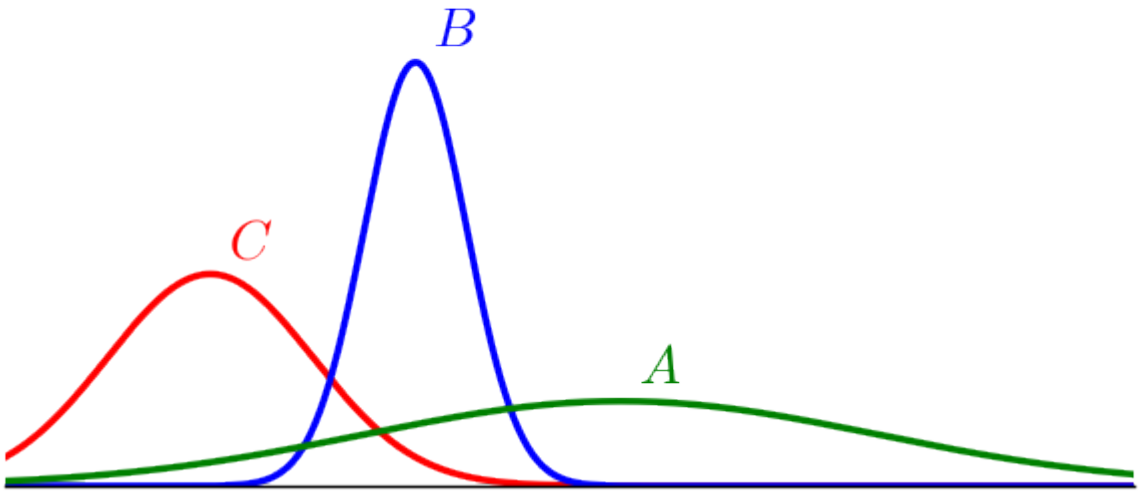
Round your answer to the nearest whole number (percent).

That is correct!

Answer: 95%

Question 12

The graph below shows the graphs of several normal distributions, labeled A, B, and C, on the same axis. Determine which normal distribution has the smallest standard deviation.



That is correct!

A
- [x] B
- [ ] C

Question 13

The resistance of a strain gauge is normally distributed with a mean of 100 ohms and a standard deviation of 0.3 ohms. To meet the specification, the resistance must be within the range 100 ± 0.7 ohms. What proportion of gauges is acceptable?

- Round your answer to four decimal places.

That is correct!

Answer: 0.9804

Question 14

A baker knows that the daily demand for strawberry pies is a random variable that follows the normal distribution with a mean of 31.8 pies and a standard deviation of 4.5 pies. Find the demand that has an 8% probability of being exceeded.

- Use Excel, and round your answer to two decimal places.

That is correct!

Answer: 38.12

Question 15

A group of friends has gotten very competitive with their board game nights. They have found that overall, they each have won an average of 18 games, with a population standard deviation of 6 games. If a sample of only 2 friends is selected at random from the group, select the expected mean and the standard deviation of the sampling distribution from the options below. Remember to round to the nearest whole number.

That is correct!

- ☐ $\sigma_{\bar{x}} = 6$ games
- ☐ $\sigma_{\bar{x}} = 3$ games
- ☑ $\sigma_{\bar{x}} = 4$ games
- ☑ $\mu_{\bar{x}} = 18$ games
- ☐ $\mu_{\bar{x}} = 3$ games
- ☐ $\mu_{\bar{x}} = 9$ games

Question 16

- An elementary school has a population of 635 students, 600 of whom have received the chicken pox vaccine. The school nurse wants to make sure that the school meets all state requirements for vaccinations at public schools.
- Find the population proportion, as well as the mean and standard deviation of the sampling distribution for samples of size $n = 120$.
- Round all answers to 3 decimal places.

That is correct!

- $p = 0.945$

- $\mu_{\hat{p}} = 0.945$
- $\sigma_{\hat{p}} = 0.021$

Question 17

The lengths of text messages are normally distributed with an unknown population mean. A random sample of text messages is taken and results in a 95% confidence interval of $(23,47)$ characters.

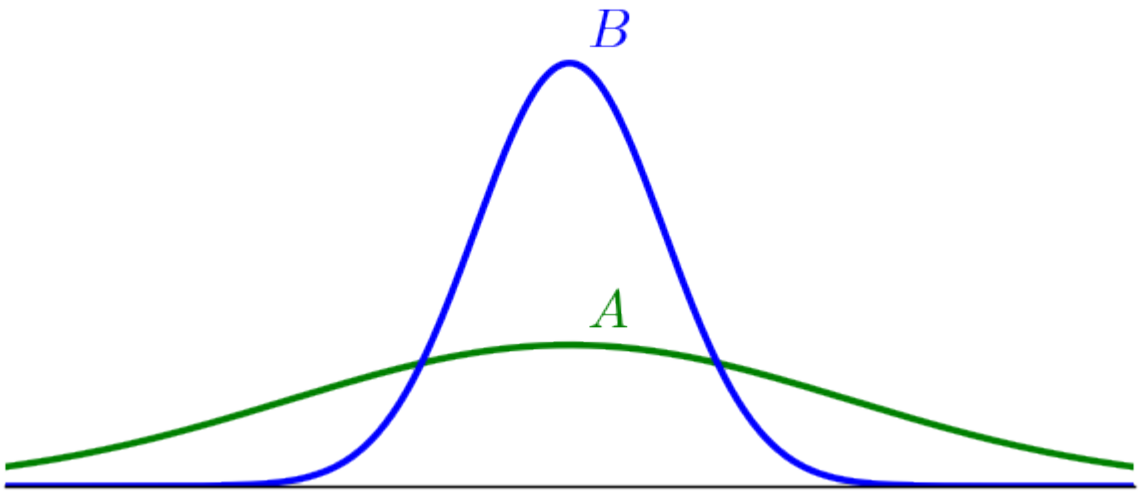
What is the correct interpretation of the 95% confidence interval?

That is correct!

- We estimate that 95% of text messages have lengths between 23 and 47 characters.
- We estimate with 95% confidence that the true population mean is between 23 and 47 characters.
- We estimate with 95% confidence that the sample mean is between 23 and 47 characters.

Question 18

Given the plot of normal distributions A and B below, which of the following statements is true? Select all correct answers.



A normal bell curve labeled Upper A and a normal elongated curve labeled Upper B are centered at the same point. Normal curve Upper B is narrower and above normal curve Upper A.

That is correct!

- A has the larger mean.

- [ ] B has the larger mean.
- [x] The means of A and B are equal.
- [x] A has the larger standard deviation.
- [ ] B has the larger standard deviation.
- [ ] The standard deviations of A and B are equal.

Question 19

A tour guide company is trying to decide if it is going to increase the cost of its tours to cover its sunk costs. They find that the average sunk cost per tour is $58, with a standard deviation of $18. If they take a random sample of 36 tours, identify each of the following to help them make their decision and round to the nearest hundredth if necessary:

Answer:

$\mu=58$

$\sigma=18$

$n=36$

$\mu_{\bar{x}}=58$

$\sigma_{\bar{x}}=3$

Question 20

From a recent company survey, it is known that the proportion of employees older than 55 and considering retirement is 8%. For a random sample of size 110, what is standard deviation for the sampling distribution of the sample proportions, rounded to three decimal places?

That is correct!

Answer: 0.26

Question 21

In order to estimate the average electricity usage per month, a sample of 125 residential customers were selected, and the monthly electricity usage was determined using the customers' meter readings. Assume a population variance of $12{,}100 kWh^2$. Use Excel to find the 98% confidence interval for the mean electricity usage in kilowatt hours. Round your answers to two decimal places and use ascending order.

Electric Usage
765
1139
714
687
1027
1109
749
799
911

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That is correct!

Answer: (894.43, 940.21)

Question 22

Hugo averages 40 words per minute on a typing test with a standard deviation of 15 words per minute. Suppose Hugo's words per minute on a typing test are normally distributed. Let $X=$ the number of words per minute on a typing test. Then, $X \sim N(40,15)$.

Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when $x=56$ is _____. This z-score tells you that $x=56$ is _____ standard deviations to the _____ (right/left) of the mean, _____.

Correctly fill in the blanks in the statement above.

That is correct!

- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when $x=56$ is -0.889. This z-score tells you that $x=56$ is 0.889 standard deviations to the **left** of the mean, 40.
- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when $x=56$ is -1.067. This z-score tells you that $x=56$ is 1.067 standard deviations to the **left** of the mean, 40.

- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is 1.067. This z-score tells you that x=56 is 1.067 standard deviations to the **right** of the mean, 40.
- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is 0.889. This z-score tells you that x=56 is 0.889 standard deviations to the **right** of the mean, 40.

Question 23

Hugo averages 62 words per minute on a typing test with a standard deviation of 8 words per minute. Suppose Hugo's words per minute on a typing test are normally distributed. Let X= the number of words per minute on a typing test. Then, $X \sim N(62,8)$.

Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is _____. This z-score tells you that x=56 is _____ standard deviations to the _____ (right/left) of the mean, _____.

Correctly fill in the blanks in the statement above.

That is correct!

- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is 0.75. This z-score tells you that x=56 is 0.75 standard deviations to the **right** of the mean, 62.
- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is −0.75. This z-score tells you that x=56 is 0.75 standard deviations to the **left** of the mean, 62.
- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is 0.545. This z-score tells you that x=56 is 0.545 standard deviations to the **right** of the mean, 62.
- Suppose Hugo types 56 words per minute in a typing test on Wednesday. The z-score when x=56 is −0.545. This z-score tells you that x=56 is 0.545 standard deviations to the **left** of the mean, 62.

Question 24

Lisa has collected data to find that the number of pages per book on a book shelf has a normal distribution. What is the probability that a randomly selected book has fewer than 168 pages if the mean is 190 pages and the standard deviation is 22 pages? Use the empirical rule.Enter your answer as a percent rounded to two decimal places if necessary.

That is correct!

Answer: 15.87%

Question 25

Lisa has collected data to find that the number of pages per book on a book shelf has a normal distribution. What is the probability that a randomly selected book has fewer than 140 pages if the mean is 190 pages and the standard deviation is 25 pages? Use the empirical rule.Enter your answer as a percent rounded to two decimal places if necessary.

That is correct!

Correct answers: 2.5%