PRINTABLE VERSION

Quiz 11

You scored 100 out of 100

Question 1

Your answer is CORRECT.

As the length of the confidence interval for the population mean decreases, the degree of confidence in the interval's actually containing the population mean

a) increases

b) decreases

c) does not change

As the length of the confidence interval decreases the degree of confidence decreases

Question 2

Your answer is CORRECT.

The gas mileage for a certain model of car is known to have a standard deviation of 6 mi/gallon. A simple random sample of 64 cars of this model is chosen and found to have a mean gas mileage of 27.5 mi/gallon. Construct a 97.5% confidence interval for the mean gas mileage for this car model.

a) [15.740, 39.260]

b) [25.819, 29.181]

c) [27.290, 27.710]

d) [26.030, 28.970]

e) [14.054, 40.946]

f) None of the above

$n = 64 \quad \sigma = 6 \text{ mi/gal} \quad \bar{x} = 27.5 \text{ mi/gal}$

$z^* = \text{qnorm}\left(\frac{1+.975}{2}\right) = 2.24$

$\bar{x} \pm z^*\left(\frac{\sigma}{\sqrt{n}}\right) = 27.5 \pm 2.24\left(\frac{6}{\sqrt{64}}\right)$

$= 27.5 \pm 1.68$

$[25.82, 29.18]$

Question 3

Your answer is CORRECT.

If the 90% confidence limits for the population mean are 57 and 63, which of the following could be the 97% confidence limits

a) [56, 64]

90%: [57, 63]

↖ wider

b) [58, 65]

c) [56, 61]

d) [59, 63]

e) [60, 60]

f) None of the above

$\bar{X} = \frac{57+63}{2} = 60$

$60 \pm 3 = [57, 63]$

Question 4

Your answer is CORRECT.

A 95% confidence interval for the mean of a population is to be constructed and must be accurate to within 0.3 unit. A preliminary sample standard deviation is 1.5. The smallest sample size n that provides the desired accuracy is

use $p = 0.5$ $s = 1.5$

a) 97

b) 91

c) 109

d) 101

e) 93

f) None of the above

$z^* = qnorm\left(\frac{1.95}{2}\right) = 1.96$ $mE = 0.3$

$mE \geq z^* \frac{s}{\sqrt{n}}$

$0.3 \geq 1.96\left(\frac{1.5}{\sqrt{n}}\right)$

$0.9 \geq \frac{8.6436}{n}$

$n \geq 96.04$ → $n = 97$

Question 5

Your answer is CORRECT.

An SRS of 30 students at UH gave an average height of 5.4 feet and a standard deviation of .3 feet. Construct a 90% confidence interval for the mean height of students at UH.

a) [5.307, 5.493]

b) [4.150, 6.850]

c) [4.890, 5.910]

d) [3.900, 7.200]

e) [5.383, 5.417]

$t^* = qt\left(\frac{1.90}{2}, 29\right) =$ qt(.95,29)
[1] 1.699127

$5.4 \pm 1.699\left(\frac{.3}{\sqrt{30}}\right) = 5.4 \pm 0.093$

$[5.307, 5.493]$

f) None of the above

Question 6

Your answer is CORRECT.

Which test statistic should be used when computing a confidence interval given only the number in a sample, the population standard deviation and sample mean?

a) μ

b) t

c) z

→ σ, $\bar{x}$, n } z

Question 7

Your answer is CORRECT.

Location is known to affect the number, of a particular item, sold by Walmart. Two different locations, A and B, are selected on an experimental basis. Location A was observed for 18 days and location B was observed for 18 days. The number of the particular items sold per day was recorded for each location. On average, location A sold 39 of these items with a sample standard deviation of 9 and location B sold 55 of these items with a sample standard deviation of 6. Select a 99% confidence interval for the difference in the true means of items sold at location A and B.

qt(0.995,17)
[1] 2.898231

a) [48.42, 61.58]

b) [32.42, 45.58]

c) [-22.95, -9.05]

d) [87.42, 100.6]

e) [-18.55, -13.45]

f) None of the above

A: $n_A = 18$ $\bar{x}_A = 39$ $s_A = 9$

B: $n_B = 18$ $\bar{x}_B = 55$ $s_B = 6$

99% CI t^* w/ df = 17

$(39 - 55) \pm 2.898 \sqrt{\frac{9^2}{18} + \frac{6^2}{18}}$

closest

-16 ± 7.38847

$[-23.388, -8.612]$

Question 8

Your answer is CORRECT.

An auditor for a hardware store chain wished to compare the efficiency of two different auditing techniques. To do this he selected a sample of nine store accounts and applied auditing techniques A and B to each of the nine accounts selected. The number of errors found in each of techniques A and B is listed in the table below:

Error A - Error B

Errors in A	Errors in B
27	13

$\bar{x} = 4.44$

$s = 6.747$

$n = 9$

$df = 8$

qt(0.995,8)
[1] 3.355387

		difference
30	19	14
28	21	11
30	19	7
34	36	11
32	27	−2
31	31	5
22	23	0
27	32	−1
		−5

Select a 99% confidence interval for the true mean difference in the two techniques.

a) [2.195, 6.693]

b) [1.084, 7.804]

c) [-3.113, 12.001]

d) [1.925, 6.963]

e) [-7.557, 7.557]

f) None of the above

$4.44 \pm 3.355 \frac{6.747}{\sqrt{9}}$

4.44 ± 7.545

closest $[-3.105, 11.985]$

Question 9

Your answer is CORRECT.

A toy maker claims his best product has an average lifespan of exactly 14 years. A skeptical quality control specialist asks for evidence (data) that might be used to evaluate this claim. The quality control specialist was provided data collected from a random sample of 45 people who used the product. Using the data, an average product lifespan of 19 years and a standard deviation of 4 years was calculated. Select the 99%, confidence interval for the true mean lifespan of this product.

a) [-1.5384, 1.5384]

b) [12.462, 15.538]

c) [17.211, 20.789]

d) [17.462, 20.538]

e) [18.771, 19.229]

f) None of the above

$n = 45 \quad \bar{x} = 19 \quad s = 4$

$t^* = qt\left(\frac{1.99}{2}, 44\right) =$ qt(0.995,44)
[1] 2.692278

$19 \pm 2.692\left(\frac{4}{\sqrt{45}}\right) = 19 \pm 1.605$

closest $[17.3948, 20.6052]$

Question 10

Your answer is CORRECT.

An important problem in industry is shipment damage. A pottery producing company ships its product by truck and determines that it can meet its profit expectations if, on average, the number of damaged items per truckload is fewer than 11. A random sample of 19 departing truckloads is selected at the delivery point and the average number of damaged items per truckload is calculated to be 9.4 with a calculated sample of variance of 0.49. Select a 95% confidence interval for the true mean of damaged items.

a) [48.91, -33.04]

b) [10.66, 11.34]

c) [9.063, 9.737]

d) [8.918, 9.882]

e) [-0.3372, 0.3372]

f) None of the above

$s = \sqrt{0.49}$ $\quad \bar{x} = 9.4$

$n = 19$ $\quad t^* = qt\left(\frac{1.95}{2}, 18\right)$

$t^* = 2.1$

$\bar{x} \pm t^* \frac{s}{\sqrt{n}}$

$9.4 \pm (2.1)\left(\frac{\sqrt{0.49}}{\sqrt{19}}\right) = 9.4 \pm 0.337$

$= [9.063, 9.737]$