Question #1 of 78

Question ID: 1456540

Which of the following is *least likely* a prediction of the central limit theorem?

A) The mean of the sampling distribution of the sample means will be equal to the population mean.

B) The standard error of the sample mean will increase as the sample size increases.

C) The variance of the sampling distribution of sample means will approach the population variance divided by the sample size.

Explanation

The standard error of the sample mean is equal to the sample standard deviation divided by the square root of the sample size. As the sample size increases, this ratio decreases. The other two choices are predictions of the central limit theorem.

(Module 5.1, LOS 5.d)

Question #2 of 78

Question ID: 1482628

An analyst divides the population of U.S. stocks into 10 equally sized sub-samples based on market value of equity. Then he takes a random sample of 50 from each of the 10 sub-samples and pools the data to create a sample of 500. This is an example of:

A) simple random sampling.

B) stratified random sampling.

C) systematic cross-sectional sampling.

Explanation

In stratified random sampling we first divide the population into subgroups, called strata, based on some classification scheme. Then we randomly select a sample from each stratum and pool the results. The size of the samples from each strata is based on the relative size of the strata relative to the population. Simple random sampling is a method of selecting a sample in such a way that each item or person in the population being studied has the same (non-zero) likelihood of being included in the sample.

(Module 5.1, LOS 5.c)

Question #3 of 78

Question ID: 1456536

Which of the following statements regarding the central limit theorem (CLT) is *least* accurate? The CLT:

A) states that for a population with mean μ and variance σ^2, the sampling distribution of the sample means for any sample of size n will be approximately normally distributed.

B) gives the variance of the distribution of sample means as σ^2 / n, where σ^2 is the population variance and n is the sample size.

C) holds for any population distribution, assuming a large sample size.

Explanation

This question is asking you to select the inaccurate statement. The CLT states that for a population with mean μ and a finite variance σ^2, the sampling distribution of the sample means becomes approximately normally distributed *as the sample size becomes large*. The other statements are accurate.

(Module 5.1, LOS 5.d)

Question #4 of 78

Question ID: 1456575

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690

Books Fast, Inc., prides itself on shipping customer orders quickly. Books Fast sampled 27 of its customers within a 200-mile radius and found a mean delivery time of 76 hours, with a sample standard deviation of 6 hours. Based on this sample and assuming a normal distribution of delivery times, what is the confidence interval for the mean delivery time at 5% significance?

A) 68.50 to 83.50 hours.

B) 65.75 to 86.25 hours.

C) 73.63 to 78.37 hours.

Explanation

The confidence interval is equal to 76 + or − (2.056)(6 / √27) = 73.63 to 78.37 hours.

Because the sample size is small, we use the t-distribution with (27 − 1) degrees of freedom.

(Module 5.2, LOS 5.h)

Question #5 of 78

Question ID: 1456580

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
24	1.318	1.711	2.064	2.492	2.797	3.745
25	1.316	1.708	2.060	2.485	2.787	3.725
26	1.315	1.706	2.056	2.479	2.779	3.707
27	1.314	1.703	2.052	2.473	2.771	3.690

A random sample of 25 Indiana farms had a mean number of cattle per farm of 27 with a sample standard deviation of five. Assuming the population is normally distributed, what would be the 95% confidence interval for the number of cattle per farm?

A) 25 to 29.

B) 22 to 32.

C) 23 to 31.

Explanation

The standard error of the sample mean = 5 / √25 = 1

Degrees of freedom = 25 − 1 = 24

From Student's t-table, $t_{5/2}$ = 2.064

The confidence interval is: 27 ± 2.064(1) = 24.94 to 29.06 or 25 to 29.

(Module 5.2, LOS 5.h)

Question #6 of 78

Question ID: 1456529

An equity analyst needs to select a representative sample of manufacturing stocks. Starting with the population of all publicly traded manufacturing stocks, she classifies each stock into one of the 20 industry groups that form the Index of Industrial Production for the manufacturing industry. She then selects four stocks from each industry. The sampling method the analyst is using is *best* characterized as:

A) systematic sampling.

B) random sampling.

C) stratified random sampling.

Explanation

In stratified random sampling, a researcher classifies a population into smaller groups based on one or more characteristics, takes a simple random sample from each subgroup, and pools the results.

A random sample is one where each member of the population has an equal chance of being selected.

Systematic sampling is where every *n*th member of the population is selected, also known as nonrandom sampling.

(Module 5.1, LOS 5.c)

Question #7 of 78

Question ID: 1456559

Which of the following characterizes the typical construction of a confidence interval *most* accurately?

A) Standard error +/- (Point estimate / Reliability factor).

B) Point estimate +/- (Reliability factor × Standard error).

C) Point estimate +/- (Standard error / Reliability factor).

Explanation

We can construct a confidence interval by adding and subtracting some amount from the point estimate. In general, confidence intervals have the following form:

Point estimate +/- Reliability factor x Standard error

Point estimate = the value of a sample statistic of the population parameter

Reliability factor = a number that depends on the sampling distribution of the point estimate and the probability the point estimate falls in the confidence interval (1 – α)

Standard error = the standard error of the point estimate

(Module 5.2, LOS 5.g)

Question #8 of 78

Question ID: 1456531

Thomas Merton, a car industry analyst, wants to investigate a relationship between the types of ads used in advertising campaigns and sales to customers in certain age groups. In order to make sure he includes manufacturers of all sizes, Merton divides the industry into four size groups and draws random samples from each group. What sampling method is Merton using?

A) Cross-sectional sampling.

B) Stratified random sampling.

C) Simple random sampling.

Explanation

In stratified random sampling, we first divide the population into subgroups based on some relevant characteristic(s) and then make random draws from each group.

(Module 5.1, LOS 5.c)

Question #9 of 78

Question ID: 1456574

A traffic engineer is trying to measure the effects of carpool-only lanes on the expressway. Based on a sample of 1,000 cars at rush hour, he finds that the mean number of occupants per car is 2.5, with a standard deviation of 0.4. Assuming that the population is normally distributed, what is the confidence interval at the 5% significance level for the number of occupants per car?

A) 2.475 to 2.525.

B) 2.455 to 2.555.

C) 2.288 to 2.712.

Explanation

The Z-score corresponding with a 5% significance level (95% confidence level) is 1.96. The confidence interval is equal to: $2.5 \pm 1.96(0.4 / \sqrt{1{,}000}) = 2.475$ to 2.525. (We can use Z-scores because the size of the sample is so large.)

(Module 5.2, LOS 5.h)

Question #10 of 78

Question ID: 1456552

As a sample size is increased, which of the following statements *best* describes the change in the standard error of the sample mean and the size of the confidence interval for the true mean?

A) The standard error decreases and the confidence interval narrows.

B) The confidence interval widens while the standard error decreases.

C) The standard error increases while the confidence interval narrows.

Explanation

Increasing the sample size will improve the accuracy of the estimated mean. As the sample size increases, both the standard error of the sample mean and the width of the confidence interval decrease.

(Module 5.1, LOS 5.e)

Question #11 of 78

Question ID: 1456524

An advantage of nonprobability sampling, as compared to probability sampling, is lower:

A) reliance on judgment.

B) sampling error.

C) cost.

Explanation

The primary advantages of nonprobability sampling are lower cost and easier access to data, as compared to probability sampling. Nonprobability sampling relies more on the analyst's judgment, and because it typically results in a sample that is less random than probability sampling, it is subject to greater sampling error.

(Module 5.1, LOS 5.a)

Question #12 of 78

Question ID: 1456579

A local high school basketball team had 18 home games this season and averaged 58 points per game. If we assume that the number of points made in home games is normally distributed, which of the following is *most likely* the range of points for a confidence interval of 90%?

A) 26 to 80.

B) 34 to 82.

C) 24 to 78.

Explanation

This question has a bit of a trick. To answer this question, remember that the mean is at the midpoint of the confidence interval. The correct confidence interval will have a midpoint of 58. (34 + 82) / 2 = 58.

(Module 5.2, LOS 5.h)

Question #13 of 78

Question ID: 1456599

When sampling from a population, the *most* appropriate sample size:

A) is at least 30.

B) involves a trade-off between the cost of increasing the sample size and the value of increasing the precision of the estimates.

C) minimizes the sampling error and the standard deviation of the sample statistic around its population value.

Explanation

A larger sample reduces the sampling error and the standard deviation of the sample statistic around its population value. However, this does not imply that the sample should be as large as possible, or that the sampling error must be as small as can be achieved. Larger samples might contain observations that come from a different population, in which case they would not necessarily improve the estimates of the population parameters. Cost also increases with the sample size. When the cost of increasing the sample size is greater than the value of the extra precision gained, increasing the sample size is not appropriate.

(Module 5.2, LOS 5.j)

Question #14 of 78

Question ID: 1456567

Cumulative Z-Table

z	0.05	0.06	0.07	0.08	0.09
2.4	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9970	0.9971	0.9972	0.9973	0.9974

The average return on the Russell 2000 index for 121 monthly observations was 1.5%. The population standard deviation is assumed to be 8.0%. What is a 99% confidence interval for the mean monthly return on the Russell 2000 index?

A) 0.1% to 2.9%.

B) -0.4% to 3.4%.

C) -6.5% to 9.5%.

Explanation

Because we know the population standard deviation, we use the z-statistic. The z-statistic reliability factor for a 99% confidence interval is 2.575. The confidence interval is 1.5% ± 2.575[(8.0%)/√121] or 1.5% ± 1.9%.

(Module 5.2, LOS 5.h)

Question #15 of 78

Question ID: 1456595

The average annual return over 20 years for a sector of mutual funds, calculated for the population of funds in that sector that have 20 years of performance history, is *most likely* to:

A) fairly state returns for the fund sector.

B) understate returns for the fund sector.

C) overstate returns for the fund sector.

Explanation

A sample suffers from survivorship bias if only surviving funds are captured in the data. Funds that cease to exist (due to poor performance) are excluded. This results in an average that overstates the annual return an investor in the sector could actually have expected to earn over the period.

(Module 5.2, LOS 5.j)

Question #16 of 78

Question ID: 1456527

Sampling error can be defined as:

A) rejecting the null hypothesis when it is true.

B) the difference between a sample statistic and its corresponding population parameter.

C) the standard deviation of a sampling distribution of the sample means.

Explanation

This is the definition.

(Module 5.1, LOS 5.b)

Question #17 of 78

Question ID: 1456557

Shawn Choate wants to choose a variable of study that has the most desirable statistical properties. The statistic he is presently considering has the following characteristics:

- The expected value of the sample mean is equal to the population mean.
- The variance of the sampling distribution is smaller than that for other estimators of the parameter.
- As the sample size increases, the standard error of the sample mean increases and the sampling distribution is centered more closely on the mean.

Choate's estimator is:

A) unbiased and efficient.

B) efficient and consistent.

C) unbiased and consistent.

Explanation

The estimator is unbiased because the expected value of the sample mean is equal to the population mean. The estimator is efficient because the variance of the sampling distribution is smaller than that for other estimators of the parameter. The estimator is not consistent. To be consistent, as the sample size increases, the standard error of the sample mean must decrease.

(Module 5.1, LOS 5.f)

Question #18 of 78

Question ID: 1456547

A sample of size n = 25 is selected from a normal population. This sample has a mean of 15 and a sample variance of 4. What is the standard error of the sample mean?

A) 0.4.

B) 0.8.

C) 2.0.

Explanation

The standard error of the sample mean is estimated by dividing the standard deviation of the sample by the square root of the sample size. The standard deviation of the sample is calculated by taking the positive square root of the sample variance $4^{1/2}$ = 2. Applying the formula: $s_x = s / n^{1/2} = 2 / (25)^{1/2} = 2 / 5 = 0.4$.

(Module 5.1, LOS 5.e)

Question #19 of 78

Question ID: 1456541

Suppose the mean debt/equity ratio of the population of all banks in the United States is 20 and the population variance is 25. A banking industry analyst uses a computer program to select a random sample of 50 banks from this population and compute the sample mean. The program repeats this exercise 1000 times and computes the sample mean each time. According to the central limit theorem, the sampling distribution of the 1000 sample means will be approximately normal if the population of bank debt/equity ratios has:

A) a Student's *t*-distribution, because the sample size is greater than 30.

B) any probability distribution.

C) a normal distribution, because the sample is random.

Explanation

The central limit theorem tells us that for a population with a mean μ and a finite variance σ^2, the sampling distribution of the sample means of all possible samples of size *n* will be approximately normally distributed with a mean equal to μ and a variance equal to σ^2/n, *no matter the distribution of the population*, assuming a large sample size.

(Module 5.1, LOS 5.d)

Question #20 of 78

Question ID: 1456584

In which one of the following cases is the t-statistic the appropriate one to use in the construction of a confidence interval for the population mean?

A) The distribution is nonnormal, the population variance is unknown, and the sample size is at least 30. ✓

B) The distribution is normal, the population variance is known, and the sample size is less than 30. ✗

C) The distribution is nonnormal, the population variance is known, and the sample size is at least 30. ✗

Explanation

The t-distribution is the theoretically correct distribution to use when constructing a confidence interval for the mean when the distribution is nonnormal and the population variance is unknown but the sample size is at least 30.

(Module 5.2, LOS 5.h)

Question #21 of 78

Question ID: 1456551

From a population of 5,000 observations, a sample of n = 100 is selected. Calculate the standard error of the sample mean if the population variance is 2500.

A) 0.2. ✗

B) 250. ✗

C) 5.00. ✓

Explanation

The standard error of the sample mean = population standard deviation / √n.

If the population variance is 2500, then the standard deviation is √2500.

Therefore, the standard error is √2500 / √100 = 5.

(Module 5.1, LOS 5.e)

Question #22 of 78

Question ID: 1456528

Which of the following is *least likely* a step in stratified random sampling?

A) The population is divided into strata based on some classification scheme.

B) The size of each sub-sample is selected to be the same across strata.

C) The sub-samples are pooled to create the complete sample.

Explanation

In stratified random sampling we first divide the population into subgroups, called strata, based on some classification scheme. Then we randomly select a sample from each stratum and pool the results. *The size of the samples from each strata is based on the relative size of the strata relative to the population and are not necessarily the same across strata.*

(Module 5.1, LOS 5.c)

Question #23 of 78

Question ID: 1456570

A nursery sells trees of different types and heights. Suppose that 75 trees chosen at random are sold for planting at City Hall. These 75 trees average 60 inches in height with a standard deviation of 16 inches.

Using this information, construct a 95% confidence interval for the mean height of all trees in the nursery.

A) 60 ± 1.96(16).

B) 60 ± 1.96(1.85).

C) 0.8 ± 1.96(16).

Explanation

Because the sample size is sufficiently large, we can use the *z*-statistic. A 95% confidence level is constructed by taking the sample mean and adding and subtracting the product of the *z*-statistic reliability factor ($z_{\alpha/2}$) times the standard error of the sample mean: $x \pm z_{\alpha/2} \times (s / n^{1/2}) = 60 \pm (1.96) \times (16 / 75^{1/2}) = 60 \pm (1.96) \times (16 / 8.6603) = 60 \pm (1.96) \times (1.85)$.

(Module 5.2, LOS 5.h)

Question #24 of 78

Question ID: 1456598

A scientist working for a pharmaceutical company tries many models using the same data before reporting the one that shows that the given drug has no serious side effects. The scientist's results are *most likely* to exhibit:

A) data snooping bias. ✓

B) look-ahead bias. ✗

C) sample selection bias. ✗

Explanation

Data snooping bias can result when the same data is used with different methods until the desired results are obtained.

(Module 5.2, LOS 5.j)

Question #25 of 78

Question ID: 1456573

Which of the following statements about a confidence interval for a population mean is *most* accurate?

A) For a sample size of 30, using a *t*-statistic will result in a wider confidence interval for a population mean than using a *z*-statistic. ✓

B) When a *z*-statistic is acceptable, a 95% confidence interval for a population mean is the sample mean plus-or-minus 1.96 times the sample standard deviation. ✗

C) If the population variance is unknown, a large sample size is required in order to estimate a confidence interval for the population mean. ✗

Explanation

Although the *t*-distribution begins to approach the shape of a normal distribution for large sample sizes, at a sample size of 30 a *t*-statistic produces a wider confidence interval than a *z*-statistic. A confidence interval for the population mean is the sample mean plus-or-minus the appropriate critical value times the *standard error*, which is the standard deviation divided by the square root of the sample size. If a population is normally distributed, we can use a *t*-statistic to construct a confidence interval for the population mean from a small sample, even if the population variance is unknown.

(Module 5.2, LOS 5.h)

Question #26 of 78

Question ID: 1456562

Which of the following statements about sampling and estimation is *most* accurate?

A) A confidence interval estimate consists of a range of values that bracket the parameter with a specified level of probability, $1 - \beta$.

B) Time-series data are observations over individual units at a point in time.

C) A point estimate is a single estimate of an unknown population parameter calculated as a sample mean.

Explanation

Time-series data are observations taken at specific and equally-spaced points.

A confidence interval estimate consists of a range of values that bracket the parameter with a specified level of probability, $1 - \alpha$.

(Module 5.2, LOS 5.g)

Question #27 of 78

Question ID: 1456597

The practice of repeatedly using the same database to search for patterns until one is found is *most likely* to result in:

A) data snooping bias.

B) look-ahead bias.

C) sample selection bias.

Explanation

The practice of data snooping involves repeatedly analyzing the same data in the hope of detecting a pattern. Data snooping bias may result because some number of apparently significant relationships are likely to appear by chance.

Look-ahead bias occurs by using information that is not available or known in the analysis period. An example is back testing a trading strategy that uses information in year-end accounts to 31st December 2019 to assist trading in the first week on January. This would not be possible as the financial statements are released several weeks after the year-end.

Sample selection bias occurs when certain information is excluded from a sample due to lack of availability. The sample will, therefore, not be a random one (i.e., where each member of the population has an equal likelihood of being selected).

(Module 5.2, LOS 5.j)

Question #28 of 78

Question ID: 1456565

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373

Based on Student's t-distribution, the 95% confidence interval for the population mean based on a sample of 40 interest rates with a sample mean of 4% and a sample standard deviation of 15% is *closest to:*

A) -0.794% to 8.794%.

B) -0.851% to 8.851%.

C) 1.261% to 6.739%.

Explanation

The standard error for the mean = $s/(n)^{0.5}$ = $15\%/(40)^{0.5}$ = 2.372%. The critical value from the t-table should be based on 40 – 1 = 39 df. Since the standard tables do not provide the critical value for 39 df the closest available value is for 40 df. This leaves us with an approximate confidence interval. Based on 95% confidence and df = 40, the critical t-value is 2.021. Therefore the 95% confidence interval is approximately: 4% ± 2.021(2.372) or 4% ± 4.794% or -0.794% to 8.794%.

(Module 5.2, LOS 5.h)

Question #29 of 78

Question ID: 1456583

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373

The average salary for a sample of 61 CFA charterholders with 10 years of experience is $200,000, and the sample standard deviation is $80,000. Assume the population is normally distributed. Which of the following is a 99% confidence interval for the population mean salary of CFA charterholders with 10 years of experience?

A) $172,514 to $227,486.

B) $160,000 to $240,000.

C) $172,754 to $227,246.

Explanation

If the distribution of the population is *normal*, but we *don't know* the population variance, we can use the Student's t-distribution to construct a confidence interval. Because there are 61 observations, the degrees of freedom are 60. From the student's t table, we can determine that the reliability factor for $t_{\alpha/2}$, or $t_{0.005}$, is 2.660. Then the 99% confidence interval is $200,000 ± 2.660($80,000 / √61) or $200,000 ± 2.660 × $10,243, or $200,000 ± $27,246.

(Module 5.2, LOS 5.h)

Question #30 of 78

Question ID: 1456566

A sample of 25 junior financial analysts gives a mean salary (in thousands) of 60. Assume the population variance is known to be 100. A 90% confidence interval for the mean starting salary of junior financial analysts is *most* accurately constructed as:

A) 60 ± 1.645(10).

B) 60 ± 1.645(2).

C) 60 ± 1.645(4).

Explanation

Because we can compute the population standard deviation, we use the z-statistic. A 90% confidence level is constructed by taking the population mean and adding and subtracting the product of the z-statistic reliability ($z_{\alpha/2}$) factor times the known standard deviation of the population divided by the square root of the sample size (note that the population variance is given and its positive square root is the standard deviation of the population): x ± $z_{\alpha/2}$ × (σ / $n^{1/2}$) = 60 +/- 1.645 × ($100^{1/2}$ / $25^{1/2}$) = 60 +/- 1.645 × (10 / 5) = 60 +/- 1.645 × 2.

(Module 5.2, LOS 5.h)

Question #31 of 78

Question ID: 1456555

The sample mean is an unbiased estimator of the population mean because the:

A) sampling distribution of the sample mean has the smallest variance of any other unbiased estimators of the population mean.

B) sample mean provides a more accurate estimate of the population mean as the sample size increases.

C) expected value of the sample mean is equal to the population mean.

Explanation

An unbiased estimator is one for which the expected value of the estimator is equal to the parameter you are trying to estimate.

(Module 5.1, LOS 5.f)

Question #32 of 78

Question ID: 1456538

According to the Central Limit Theorem, the distribution of the sample means is approximately normal if:

A) the sample size n > 30.

B) the standard deviation of the population is known.

C) the underlying population is normal.

Explanation

The Central Limit Theorem states that if the sample size is sufficiently large (i.e. greater than 30) the sampling distribution of the sample means will be approximately normal.

(Module 5.1, LOS 5.d)

Question #33 of 78

Question ID: 1456564

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373

The approximate 99% confidence interval for the population mean based on a sample of 60 returns with a mean of 7% and a sample standard deviation of 25% is *closest* to:

A) 0.546% to 13.454%.

B) 1.584% to 14.584%.

C) -1.584% to 15.584%.

Explanation

The standard error for the mean = s / $(n)^{0.5}$ = 25% / $(60)^{0.5}$ = 3.227%. The critical value from the t-table should be based on 60 − 1 = 59 df. Since the standard tables do not provide the critical value for 59 df the closest available value is for 60 df. This leaves us with an approximate confidence interval. Based on 99% confidence and df = 60, the critical t-value is 2.660. Therefore the 99% confidence interval is approximately: 7% ± 2.660(3.227) or 7% ± 8.584% or -1.584% to 15.584%.

If you use a z-statistic, the confidence interval is 7% ± 2.58(3.227) = -1.326% to 15.326%, which is closest to the correct choice.

(Module 5.2, LOS 5.h)

Question #34 of 78

Question ID: 1456532

An analyst is asked to select a sample of securities from those included in a broad-based index that can be expected to have the same return as the index while preserving the key risk exposures of the index. The analyst should *most appropriately* use:

A) simple random sampling. ✗

B) constrained random sampling. ✗

C) stratified random sampling. ✓

Explanation

Stratified random sampling is used to preserve characteristics of an underlying dataset. (Module 5.1, LOS 5.c)

Question #35 of 78

Question ID: 1456588

Which technique for estimating the standard error of the sample mean involves calculating multiple means from the same sample, each with one observation removed from the sample?

A) Jackknife. ✓

B) Bootstrap. ✗

C) Sample variance. ✗

Explanation

The jackknife technique involves calculating the standard deviation of the means from samples, each of which is calculated with a different observation removed from the original sample. The bootstrap method involves drawing multiple random samples from a dataset and calculating the standard deviation of those sample means. Standard error based on the standard deviation of a single sample is estimated by dividing the sample standard deviation by the square root of the sample size.

(Module 5.2, LOS 5.i)

Question #36 of 78

Question ID: 1456556

An efficient estimator is *most accurately* described as one that:

A) has an expected value equal to the parameter it is estimating. ✗

B) becomes more accurate as the sample size increases. ✗

C) has a sampling distribution with a smaller variance than that of all other unbiased estimators of the parameter. ✓

Explanation

An estimator is *efficient* if the variance of its sampling distribution is smaller than that of all other unbiased estimators of the parameter. An *unbiased* estimator has an expected value equal to the parameter it is estimating. A *consistent* estimator becomes more accurate as the sample size increases.

(Module 5.1, LOS 5.f)

Question #37 of 78

Question ID: 1456525

Sampling error is the:

A) difference between a sample statistic and its corresponding population parameter. ✓

B) difference between the point estimate of the mean and the mean of the sampling distribution. ✗

C) estimation error created by using a non-random sample. ✗

Explanation

Sampling error is the difference between any sample statistic (the mean, variance, or standard deviation of the sample) and its corresponding population parameter (the mean, variance or standard deviation of the population). For example, the sampling error for the mean is equal to the sample mean minus the population mean.

(Module 5.1, LOS 5.b)

Question #38 of 78

Question ID: 1456561

Which of the following statements about sampling and estimation is *most accurate*?

A) The probability that a parameter lies within a range of estimated values is given by α.

B) The standard error of the sample means when the standard deviation of the population is known equals σ / √n, where σ = sample standard deviation adjusted by n − 1.

C) The standard error of the sample means when the standard deviation of the population is unknown equals s / √n, where s = sample standard deviation.

Explanation

The probability that a parameter lies within a range of estimated values is given by 1 − α. The standard error of the sample means when the standard deviation of the population is known equals σ / √n, where σ = *population* standard deviation.

(Module 5.2, LOS 5.g)

Question #39 of 78

Question ID: 1456587

In a confidence interval for the mean of a normally distributed population with a sample size of 25, it is *least likely* that:

A) a t-distributed test statistic is appropriate if the population variance is unknown.

B) a z-distributed test statistic is appropriate if the population variance is known.

C) no test statistic is available.

Explanation

No test statistic is available when sampling from a *non-normally* distributed population. If a *normally* distributed population has a known variance, a *z*-test is appropriate, even with a small sample, and if its population variance is unknown, a *t*-statistic is appropriate with a small sample.

(Module 5.2, LOS 5.h)

Question #40 of 78

Question ID: 1456549

If the number of offspring for females of a certain mammalian species has a mean of 16.4 and a standard deviation of 3.2, what will be the standard error of the sample mean for a survey of 25 females of the species?

A) 0.64. ✓

B) 0.07. ✗

C) 1.56. ✗

Explanation

The standard error of the sample mean when the standard deviation of the population is known is equal to the standard deviation of the population divided by the square root of the sample size. In this case, $3.2 / \sqrt{25} = 0.64$.

It is a measure of how much the sample mean is likely to deviate from the population mean. The larger the sample selected, the lower the standard error, and so the less the sample mean will deviate from the true population mean.

(Module 5.1, LOS 5.e)

Question #41 of 78

Question ID: 1456589

An advantage of the bootstrap method of estimating the standard error of sample means, compared to estimating it based on a sample variance, is that the bootstrap method:

A) is less computationally demanding. ✗

B) only requires one sample to be taken. ✗

C) can be applied to complex statistics. ✓

Explanation

Calculating the standard error of sample means based on a single sample variance is most appropriate when the sample is unbiased and the population is approximately normally distributed. When these conditions do not hold, the bootstrap method may be more appropriate. This method is more computationally demanding in that it requires the analyst to calculate the means of multiple samples from the full dataset.

(Module 5.2, LOS 5.i)

Question #42 of 78

Question ID: 1456542

If the true mean of a population is 16.62, according to the central limit theorem, the mean of the distribution of sample means, for all possible sample sizes n will be:

A) 16.62 / √n.

B) indeterminate for sample with n < 30.

C) 16.62.

Explanation

According to the central limit theorem, the mean of the distribution of sample means will be equal to the population mean. n > 30 is only required for distributions of sample means to approach normal distribution.

(Module 5.1, LOS 5.d)

Question #43 of 78

Question ID: 1456600

To test the hypothesis that actively managed international equities mutual funds outperformed an appropriate benchmark index, an analyst selects all of the current international equities funds that have been in existence for at least 10 years. His test results will *most likely* be subject to:

A) survivorship bias.

B) look-ahead bias.

C) time period bias.

Explanation

When constructing samples, researchers must be careful not to include just survivors (e.g., surviving companies, mutual funds, or investment newsletters). Since survivors tend to be those that have done well (by skill or chance), funds that have 10-year track records will exhibit performance histories with upward bias—mutual fund companies regularly discontinue funds with poor performance histories or roll their assets into better performing funds. Time period bias occurs when the period chosen is so short that it shows relationships that are unlikely to recur, or so long that it includes fundamental changes in the relationship being observed. A 10-year period typically includes a full economic cycle and is likely to be appropriate for this test. Look-ahead bias is present if the test relates a variable to data that were not available at the points in time when that variable's outcomes were observed.

(Module 5.2, LOS 5.j)

Question #44 of 78

Question ID: 1456554

The sample mean is a consistent estimator of the population mean because the:

A) sampling distribution of the sample mean has the smallest variance of any other unbiased estimators of the population mean. ✗

B) sample mean provides a more accurate estimate of the population mean as the sample size increases. ✓

C) expected value of the sample mean is equal to the population mean. ✗

Explanation

A consistent estimator provides a more accurate estimate of the parameter as the sample size increases.

(Module 5.1, LOS 5.f)

Question #45 of 78

Question ID: 1456581

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373

From a sample of 41 monthly observations of the S&P Mid-Cap index, the mean monthly return is 1% and the sample variance is 36. For which of the following intervals can one be *closest* to 95% confident that the population mean is contained in that interval?

A) 1.0% ± 1.9%.

B) 1.0% ± 6.0%.

C) 1.0% ± 1.6%.

Explanation

If the distribution of the population is *nonnormal*, but we *don't know* the population variance, we can use the Student's t-distribution to construct a confidence interval. The sample standard deviation is the square root of the variance, or 6%. Because there are 41 observations, the degrees of freedom are 40. From the Student's *t* distribution, we can determine that the reliability factor for $t_{0.025}$, is 2.021. Then the 95% confidence interval is 1.0% ± 2.021(6 / √41) or 1.0% ± 1.9%.

(Module 5.2, LOS 5.h)

Question #46 of 78

Question ID: 1456537

The central limit theorem concerns the sampling distribution of the:

A) population mean.

B) sample mean.

C) sample standard deviation.

Explanation

The central limit theorem tells us that for a population with a mean m and a finite variance σ^2, the sampling distribution of the *sample means* of all possible samples of size n will approach a normal distribution with a mean equal to μ and a variance equal to σ^2 / n as *n* gets large.

(Module 5.1, LOS 5.d)

Question #47 of 78

Question ID: 1456585

Which of the following would result in a wider confidence interval? A:

A) higher degree of confidence. ✓

B) greater level of significance. ✗

C) higher alpha level. ✗

Explanation

A higher degree of confidence (e.g. 99% instead of 95%) would require a higher reliability factor (2.575 instead of 1.96 assuming a normal distribution). A wider confidence interval corresponds to a lower alpha significance level and the point estimate does not affect the width of the confidence interval.

(Module 5.2, LOS 5.h)

Question #48 of 78

Question ID: 1456546

Melissa Cyprus, CFA, is conducting an analysis of inventory management practices in the retail industry. She assumes the population cross-sectional standard deviation of inventory turnover ratios is 20. How large a random sample should she gather in order to ensure a standard error of the sample mean of 4?

A) 20. ✗

B) 25. ✓

C) 80. ✗

Explanation

Given the population standard deviation and the standard error of the sample mean, you can solve for the sample size. Because the standard error of the sample mean equals the standard deviation of the population divided by the square root of the sample size, $4 = 20 / n^{1/2}$, so $n^{1/2} = 5$, so $n = 25$.

(Module 5.1, LOS 5.e)

Question #49 of 78

Question ID: 1456539

The central limit theorem states that, for any distribution, as *n* gets larger, the sampling distribution:

A) approaches a normal distribution. ✓

B) approaches the mean. ✗

C) becomes larger. ✗

Explanation

As *n* gets larger, the variance of the distribution of sample means is reduced, and the distribution of sample means approximates a normal distribution.

(Module 5.1, LOS 5.d)

Question #50 of 78

Question ID: 1456601

A study finds that stocks with low price-to-book-value ratios, using end-of-year stock prices and book values per share, have positive abnormal returns in January on average. This study *most likely* suffers from:

A) time-period bias. ✗

B) look-ahead bias. ✓

C) sample selection bias. ✗

Explanation

Look-ahead bias occurs when a study examines an effect based on information that was not yet available at the time being tested. In this case, year-end book values per share are not known until well into the first quarter of the following year.

Time-period bias is present when a study covers either too short a period (the proposed relationship may only hold during that time frame) or too long a period (the proposed relationship may have changed during that span). Sample selection bias refers to taking a sample that is not representative of the population being studied. (Module 5.2, LOS 5.j)

Question #51 of 78

Question ID: 1456592

An article in a trade journal suggests that a strategy of buying the seven stocks in the S&P 500 with the highest earnings-to-price ratio at the end of the calendar year and holding them until March 20 of the following year produces significant trading profits. Upon reading further, you discover that the study is based on data from 1993 to 1997, and the earnings-to-price ratio is calculated using the stock price on December 31 of each year and the annual reported earnings per share for that year. Which of the following biases is *least likely* to influence the reported results?

A) Survivorship bias. ✓

B) Look-ahead bias. ✗

C) Time-period bias. ✗

Explanation

Survivorship bias is not likely to significantly influence the results of this study because the authors looked at the stocks in the S&P 500 at the beginning of the year and measured performance over the following three months. Look-ahead bias could be a problem because earnings-price ratios are calculated and the trading strategy implemented at a time before earnings are actually reported. Finally, the study is conducted over a relatively short time period during the long bull market of the 1990s. This suggests the results may be time-specific and the result of time-period bias.

(Module 5.2, LOS 5.j)

Question #52 of 78

Question ID: 1456578

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
18	1.330	1.734	2.101	2.552	2.878	3.922
19	1.328	1.729	2.093	2.539	2.861	3.883
20	1.325	1.725	2.086	2.528	2.845	3.850

A traffic engineer is trying to measure the effects of carpool-only lanes on the expressway. Based on a sample of 20 cars at rush hour, he finds that the mean number of occupants per car is 2.5, with a standard deviation of 0.4. If the population is normally distributed, a 95% confidence interval for the number of occupants per car is:

A) 2.313 to 2.687.

B) 2.387 to 2.613.

C) 2.410 to 2.589.

Explanation

The reliability factor for a 95% confidence level for the Student's t-distribution with (20 − 1) degrees of freedom is 2.093. The confidence interval is equal to: 2.5 ± 2.093(0.4 / √20) = 2.313 to 2.687. (We must use the Student's t-distribution and reliability factors because of the small sample size.)

(Module 5.2, LOS 5.h)

Question #53 of 78

Question ID: 1456590

Which of the following is the *best* method to avoid data snooping bias when testing a profitable trading strategy?

A) Test the strategy on a different data set than the one used to develop the rules.

B) Increase the sample size to at least 30 observations per year.

C) Use a sample free of survivorship bias.

Explanation

Data snooping bias occurs when the analyst repeatedly "drills" the dataset until something statistically significant is found.

The *best* way to avoid data snooping is to test a potentially profitable trading rule on a data set different than the one you used to develop the rule (out-of-sample data). Neither a larger sample size nor a data set free of survivorship bias will prevent data snooping.

(Module 5.2, LOS 5.j)

Question #54 of 78

Question ID: 1456545

From a population with a standard deviation of 15, a sample of 25 observations is taken. The standard error of the sample mean is:

A) 1.67.

B) 3.00.

C) 0.60.

Explanation

The standard error of the sample mean equals the standard deviation of the population divided by the square root of the sample size $\sigma / \sqrt{n} = 15 / \sqrt{25} = 3$.

The standard error measures how much the sample mean deviates from the true population mean. The smaller the standard error, the closer the sample mean is likely to lie to the true population mean.

(Module 5.1, LOS 5.e)

Question #55 of 78

Question ID: 1456576

The average return on small stocks over the period 1926-1997 was 17.7%, and the standard deviation of the sample was 33.9%. Assuming returns are normally distributed, the 95% confidence interval for the return on small stocks next year is:

A) –48.7% to 84.1%.

B) 16.8% to 18.6%.

C) –16.2% to 51.6%.

Explanation

A 95% confidence interval is ± 1.96 standard deviations from the mean, so 0.177 ± 1.96(0.339) = (–48.7%, 84.1%).

(Module 5.2, LOS 5.h)

Question #56 of 78

Question ID: 1456558

The range of possible values in which an actual population parameter may be observed at a given level of probability is known as a:

A) degree of confidence. ✗

B) significance level. ✗

C) confidence interval. ✓

Explanation

A confidence interval is a range of values within which the actual value of a parameter will lie, given a specified probability level. A point estimate is a single value used to estimate a population parameter. An example of a point estimate is a sample mean. The degree of confidence is the confidence level associated with a confidence interval and is computed as $1 - \alpha$.

(Module 5.2, LOS 5.g)

Question #57 of 78

Question ID: 1456553

A statistical estimator is unbiased if:

A) the expected value of the estimator is equal to the population parameter. ✓

B) the variance of its sampling distribution is smaller than that of all other estimators. ✗

C) an increase in sample size decreases the standard error. ✗

Explanation

Desirable properties of an estimator are unbiasedness, efficiency, and consistency. An estimator is unbiased if its expected value is equal to the population parameter it is estimating. An estimator is efficient if the variance of its sampling distribution is smaller than that of all other unbiased estimators. An estimator is consistent if an increase in sample size decreases the standard error.

(Module 5.1, LOS 5.f)

Question #58 of 78

Question ID: 1456560

A range of estimated values within which the actual value of a population parameter will lie with a given probability of $1 - \alpha$ is a(n):

A) α percent confidence interval.

B) α percent point estimate.

C) $(1 - \alpha)$ percent confidence interval.

Explanation

A 95% confidence interval for the population mean (α = 5%), for example, is a range of estimates within which the actual value of the population mean will lie with a probability of 95%. Point estimates, on the other hand, are *single* (sample) values used to estimate population parameters. There is no such thing as a α percent *point estimate* or a $(1 - \alpha)$ percent *cross-sectional point estimate.*

(Module 5.2, LOS 5.g)

Question #59 of 78

Question ID: 1456571

A sample size of 25 is selected from a normal population. This sample has a mean of 15 and the population variance is 4.

Using this information, construct a 95% confidence interval for the population mean, m.

A) 15 ± 1.96(0.4).

B) 15 ± 1.96(0.8).

C) 15 ± 1.96(2).

Explanation

Because we can compute the population standard deviation, we use the z-statistic. A 95% confidence level is constructed by taking the population mean and adding and subtracting the product of the z-statistic reliability ($z_{\alpha/2}$) factor times the known standard deviation of the population divided by the square root of the sample size (note that the population variance is given and its positive square root is the standard deviation of the population): $x \pm z_{\alpha/2} \times (\sigma / n^{1/2}) = 15 \pm 1.96 \times (4^{1/2} / 25^{1/2}) = 15 \pm 1.96 \times (0.4)$.

(Module 5.2, LOS 5.h)

Question #60 of 78

Question ID: 1456563

Which of the following statements about confidence intervals is *least accurate*? A confidence interval:

A) expands as the probability that a point estimate falls within the interval decreases.

B) has a significance level that is equal to one minus the degree of confidence.

C) is constructed by adding and subtracting a given amount from a point estimate.

Explanation

A confidence interval contracts as the probability that a point estimate falls within the interval decreases.

(Module 5.2, LOS 5.g)

Question #61 of 78

Question ID: 1456533

Stratified random sampling is most often used to preserve the distribution of risk factors when creating a portfolio to track an index of:

A) stocks.

B) corporate bonds.

C) alternative investments.

Explanation

Stratified sampling is most often used for bond portfolios.

(Module 5.1, LOS 5.c)

Question #62 of 78

Question ID: 1456596

A research paper that reports finding a profitable trading strategy without providing any discussion of an economic theory that makes predictions consistent with the empirical results is *most likely* evidence of:

A) data snooping.

B) a non-normal population distribution.

C) a sample that is not large enough.

Explanation

Data snooping occurs when the analyst continually uses the same database to search for patterns or trading rules until he finds one that *works*. If you are reading research that suggests a profitable trading strategy, make sure you heed the following warning signs of data snooping:

Evidence that the author used many variables (most unreported) until he found ones that were significant.

The lack of any economic theory that is consistent with the empirical results.

(Module 5.2, LOS 5.j)

Question #63 of 78

Question ID: 1456593

An analyst has compiled stock returns for the first 10 days of the year for a sample of firms and estimated the correlation between these returns and changes in book value for these firms over the just ended year. What objection could be raised to such a correlation being used as a trading strategy?

A) Use of year-end values causes sample selection bias.

B) The study suffers from look-ahead bias.

C) Use of year-end values causes time-period bias.

Explanation

The study suffers from look-ahead bias because traders at the beginning of the year would not be able to know the book value changes. Financial statements usually take 60 to 90 days to be completed and released.

(Module 5.2, LOS 5.j)

Question #64 of 78

Question ID: 1456568

Fred's Correspondence College wants to construct a 90% confidence interval for the mean starting salaries of its graduates. A sample of 100 recent graduates has a mean of $50,000 and a standard deviation of $30,000. Assuming the population of graduates' starting salaries is normally distributed, the College's confidence interval is *closest* to:

A) $0 to $100,000.

B) $44,000 to $56,000.

C) $45,000 to $55,000.

Explanation

Because the sample size is large and the population is normally distributed, we can acceptably use a *z*-statistic. A 90% confidence level for the population mean is constructed by taking the sample mean and adding and subtracting the product of the *z*-statistic reliability ($z_{\alpha/2}$) factor times the sample standard deviation divided by the square root of the sample size: $x \pm z_{\alpha/2} \times (s / n^{1/2}) = 50{,}000 \pm 1.645 \times (30{,}000 / 100^{1/2}) = 50{,}000 \pm 4{,}935 =$ \$45,065 to \$54,935.

(Module 5.2, LOS 5.h)

Question #65 of 78

Question ID: 1456591

An analyst has reviewed market data for returns from 1980–1990 extensively, searching for patterns in the returns. She has found that when the end of the month falls on a Saturday, there are usually positive returns on the following Thursday. She has engaged in:

A) data snooping.

B) biased selection.

C) time period bias.

Explanation

Data snooping refers to the extensive review of the same database searching for patterns.

(Module 5.2, LOS 5.j)

Question #66 of 78

Question ID: 1456594

A study reports that from 2002 to 2004 the average return on growth stocks was twice as large as that of value stocks. These results *most likely* reflect:

A) look-ahead bias.

B) survivorship bias.

C) time-period bias.

Explanation

Time-period bias can result if the time period over which the data is gathered is either too short because the results may reflect phenomenon specific to that time period, or if a change occurred during the time frame that would result in two different return distributions. In this case the time period sampled is probably not large enough to draw any conclusions about the long-term relative performance of value and growth stocks, even if the sample size within that time period is large.

Look-ahead bias occurs when the analyst uses historical data that was not publicly available at the time being studied. Survivorship bias is a form of sample selection bias in which the observations in the sample are biased because the elements of the sample that *survived* until the sample was taken are different than the elements that dropped out of the population.

(Module 5.2, LOS 5.j)

Question #67 of 78

Question ID: 1456569

What is the 95% confidence interval for a population mean with a known population variance of 9, based on a sample of 400 observations with mean of 96?

A) 95.706 to 96.294.

B) 95.118 to 96.882.

C) 95.613 to 96.387.

Explanation

Because we can compute the population standard deviation, we use the z-statistic. A 95% confidence level is constructed by taking the population mean and adding and subtracting the product of the z-statistic reliability ($z_{\alpha/2}$) factor times the known standard deviation of the population divided by the square root of the sample size (note that the population variance is given and its positive square root is the standard deviation of the population): x $\pm z_{\alpha/2} \times (\sigma / n^{1/2}) = 96 \pm 1.96 \times (9^{1/2} / 400^{1/2}) = 96 \pm 1.96 \times (0.15) = 96 \pm 0.294 = 95.706$ to 96.294.

(Module 5.2, LOS 5.h)

Question #68 of 78

Question ID: 1456586

Which of the following statements regarding confidence intervals is *most* accurate?

A) The lower the degree of confidence, the wider the confidence interval.

B) The higher the significance level, the wider the confidence interval.

C) The lower the significance level, the wider the confidence interval.

Explanation

A higher degree of confidence requires a wider confidence interval. The degree of confidence is equal to one minus the significance level, and so the wider the confidence interval, the higher the degree of confidence and the lower the significance level.

(Module 5.2, LOS 5.h)

Question #69 of 78

Question ID: 1456526

Which of the following statements about sampling errors is *least accurate*?

A) Sampling error is the difference between a sample statistic and its corresponding population parameter.

B) Sampling error is the error made in estimating the population mean based on a sample mean.

C) Sampling errors are errors due to the wrong sample being selected from the population.

Explanation

Sampling error is the difference between a sample statistic (the mean, variance, or standard deviation of the sample) and its corresponding population parameter (the mean, variance, or standard deviation of the population).

(Module 5.1, LOS 5.b)

Question #70 of 78

Question ID: 1456582

Student's *t*-Distribution

Level of Significance for One-Tailed Test						
df	**0.100**	**0.050**	**0.025**	**0.01**	**0.005**	**0.0005**
Level of Significance for Two-Tailed Test						
df	**0.20**	**0.10**	**0.05**	**0.02**	**0.01**	**0.001**
30	1.310	1.697	2.042	2.457	2.750	3.646
40	1.303	1.684	2.021	2.423	2.704	3.551
60	1.296	1.671	2.000	2.390	2.660	3.460
120	1.289	1.658	1.980	2.358	2.617	3.373

From a sample of 41 orders for an on-line bookseller, the average order size is $75, and the sample standard deviation is $18. Assume the distribution of orders is normal. For which interval can one be exactly 90% confident that the population mean is contained in that interval?

A) $70.27 to $79.73.

B) $74.24 to $75.76.

C) $71.29 to 78.71.

Explanation

If the distribution of the population is *normal*, but we *don't know* the population variance, we can use the Student's t-distribution to construct a confidence interval. Because there are 41 observations, the degrees of freedom are 40. From Student's *t* table, we can determine that the reliability factor for $t_{\alpha/2}$, or $t_{0.05}$, is 1.684. Then the 90% confidence interval is $75.00 ± 1.684($18.00 / √41), or $75.00 ± 1.684 × $2.81 or $75.00 ± $4.73

(Module 5.2, LOS 5.h)

Question #71 of 78

Question ID: 1456535

An auditor who decides to handpick rather than randomly select transactions to examine for instances of fraud is *most likely* using:

A) judgmental sampling.

B) convenience sampling.

C) cluster sampling.

Explanation

Judgmental sampling refers to using expert or professional judgement to select observations from a population.

(Module 5.1, LOS 5.c)

Question #72 of 78

Question ID: 1456550

A traffic engineer is trying to measure the effects of carpool-only lanes on the expressway. Based on a sample of 100 cars at rush hour, he finds that the mean number of occupants per car is 2.5, and the sample variance is 0.16. What is the standard error of the sample mean?

A) 0.04.

B) 5.68.

C) 0.016.

Explanation

The standard error = sample standard deviation / √n.

If the sample variance in 0.16, then the sample standard deviation is √0.16.

The standard error is, therefore, √0.16 / √100 = 0.04.

(Module 5.1, LOS 5.e)

Question #73 of 78

Question ID: 1456544

The sample mean return of Bartlett Co. is 3% and the standard deviation is 6% based on 30 monthly returns. What is the confidence interval of a two tailed z-test of the population mean with a 5% level of significance?

A) 2.61 to 3.39.

B) 1.90 to 4.10.

C) 0.85 to 5.15.

Explanation

The standard error of the sample is the standard deviation divided by the square root of n, the sample size. 6% / $30^{1/2}$ = 1.0954%.

The confidence interval = point estimate +/- (reliability factor × standard error)

confidence interval = 3 +/- (1.96 × 1.0954) = 0.85 to 5.15

(Module 5.1, LOS 5.e)

Question #74 of 78

Question ID: 1456534

To estimate the average time Level I CFA candidates spend preparing for the exam, an employee of ABC Investments decides to randomly survey candidates who work at ABC's offices, although he is unsure how well they represent the candidate population. This is *most likely* an example of:

A) convenience sampling. ✓

B) judgmental sampling. ✗

C) stratified sampling. ✗

Explanation

Convenience sampling refers to sampling an element of a population based on ease of access.

(Module 5.1, LOS 5.c)

Question #75 of 78

Question ID: 1456543

Joseph Lu calculated the average return on equity at 14% for a sample of 64 companies. The sample standard deviation is 16%. The standard error of the mean is *closest* to:

A) 0.0200. ✓

B) 0.0025. ✗

C) 0.0175. ✗

Explanation

The standard error of the mean = σ/√n or = s/√n if the population variance is unknown.

The standard error is, therefore, 0.16/√64 = 0.02.

A mean calculated from a sample selected at random from the population will deviate from the true population mean. This deviation is referred to as the standard error.

The smaller the standard error, the smaller the deviation; hence, the closer the sample mean is likely to be to the true population mean.

(Module 5.1, LOS 5.e)

Question #76 of 78

Question ID: 1456548

The following data are available on a sample of advertising budgets of 81 U.S. manufacturing companies: The mean budget is $10 million. The sample variance is 36 million. The standard error of the sample mean is:

A) $1,111.

B) $667.

C) $400.

Explanation

The sample standard deviation is the square root of the variance: $(36{,}000{,}000)^{1/2}$ = $6,000. The standard error of the sample mean is estimated by dividing the standard deviation of the sample by the square root of the sample size: $\sigma_{mean} = s / (n)^{1/2} = 6{,}000 / (81)^{1/2} =$ $667.

(Module 5.1, LOS 5.e)

Question #77 of 78

Question ID: 1456572

The average U.S. dollar/Euro exchange rate from a sample of 36 monthly observations is $1.00/Euro. The population variance is 0.49. What is the 95% confidence interval for the mean U.S. dollar/Euro exchange rate?

A) $0.8075 to $1.1925.

B) $0.7713 to $1.2287.

C) $0.5100 to $1.4900.

Explanation

The population *standard deviation* is the square root of the variance (√0.49 = 0.7). Because we know the population standard deviation, we use the z-statistic. The z-statistic reliability factor for a 95% confidence interval is 1.960. The confidence interval is \$1.00 ± 1.960(\$0.7 / √36) or \$1.00 ± \$0.2287.

(Module 5.2, LOS 5.h)

Question #78 of 78

Question ID: 1456577

A sample of 100 individual investors has a mean portfolio value of \$28,000 with a standard deviation of \$4,250. The 95% confidence interval for the population mean is *closest* to:

A) \$27,575 to \$28,425.

B) \$19,500 to \$28,333.

C) \$27,159 to \$28,842.

Explanation

Confidence interval = mean ± t_c{S / √n}

= 28,000 ± (1.98) (4,250 / √100) or 27,159 to 28,842

If you use a *z*-statistic because of the large sample size, you get 28,000 ± (1.96) (4,250 / √100) = 27,167 to 28,833, which is closest to the correct answer.

(Module 5.2, LOS 5.h)