**AP STATISTICS**

**CH. 8 Practice Test**

**SPRING 2018**

**1.** You want to compute a 96% confidence interval for a population mean. Assume that the population standard deviation is known to be 10 and the sample size is 50. The critical value to be used in this calculation is

 (a) 1.960

 (b) 1.645

 (c) 1.7507

 (d) 2.0537

**2.** You have measured the systolic blood pressure of a random sample of 25 employees of a

company located near you. A 95% confidence interval for the mean systolic blood pressure for the employees of this company is (122, 138). Which of the following statements gives a valid interpretation of this interval?

(a) Ninety-five percent of the sample of employees have a systolic blood pressure between 122 and 138.

(b) Ninety-five percent of the population of employees have a systolic blood pressure between 122 and 138.

(c) If the procedure were repeated many times, 95% of the resulting confidence intervals would contain the population mean systolic blood pressure.

 (d) The probability that the population mean blood pressure is between 122 and 138 is 0.95.

 (e) If the procedure were repeated many times, 95% of the sample means would be between 122 and 138.

**3.** An analyst, using a random sample of *n* = 500 families, obtained a 90% confidence interval for mean monthly family income for a large population: ($600, $800). If the analyst had used a 99% confidence level instead, the confidence interval would be:

1. Narrower and would involve a larger risk of being incorrect
2. Wider and would involve a smaller risk of being incorrect
3. Narrower and would involve a smaller risk of being incorrect
4. Wider and would involve a larger risk of being incorrect
5. Wider but it cannot be determined whether the risk of being incorrect would be larger or smaller

**4.** The value of z\* in a 99% confidence interval is

1. The value in standard normal curve where 99% of data is above that number
2. The value in a standard normal curve where 99% of data is below that number
3. The value in a standard normal curve where 99% of the data falls
4. The value in a standard normal curve where 99% of the data is less than that distance from the sample mean.
5. None of the above is correct.

**5.** You want to compute a 90% confidence interval for the mean of a population with unknown population standard deviation. The sample size is 30. The value of *t\** you would use for this interval is

 (a) 1.96

 (b) 1.645

 (c) 1.699

 (d) 0.90

 (e) 1.311

**6.** To assess the accuracy of a laboratory scale, a standard weight that is known to weigh 1 gram is repeatedly weighed a total of *n* times and the mean  of the weighings is computed. Suppose the scale readings are Normally distributed with unknown mean  and standard deviation

 = 0.01 g. How large should *n* be so that a 95% confidence interval for  has a margin of error of ± 0.0001?

1. 100 (b) 196 (c) 27,061 (d) 10,000 (e) 38,416

7. A random sample of 900 individuals has been selected from a large population. It was found that 180 are regular users of vitamins. Thus, the proportion of the regular users of vitamins in the population is estimated to be 0.20. The standard error of this estimate is approximately

1. 0.1600
2. 0.0002
3. 0.4000
4. 0.0133
5. 0.0267

8. The effect of acid rain upon the yield of crops is of concern in many places. In order to determine baseline yields, a sample of 13 fields was selected, and the yield of barley (g/400 m2) was determined. The output from SAS appears below:

 QUANTILES(DEF=4) EXTREMES

N 13 SUM WGTS 13 100% MAX 392 99% 392 LOW HIGH

MEAN 220.231 SUM 2863 75% Q3 234 95% 392 161 225

STD DEV 58.5721 VAR 3430.69 50% MED 221 90% 330 168 232

SKEW 2.21591 KURT 6.61979 25% Q1 174 10% 163 169 236

USS 671689 CSS 41168.3 0% MIN 161 5% 161 179 239

CV 26.5958 STD MEAN 16.245 1% 161 205 392

 A 95% confidence interval for the mean yield is

 (a) 220.2 ± 1.96(58.6) (b) 220.2 ± 1.96(16.2) (c) 220.2 ± 2.18(58.6)

 (d) 220.2 ± 2.18(16.2) (e) 220.2 ± 2.16(16.2)

9. The weights of 9 men have mean  = 175 pounds and standard deviation *s* = 15 pounds. What is the standard error of the mean?

 (a) 58.3 (b) 19.4 (c) 5 (d) 1.7

10. A 95% confidence interval for the mean reading achievement score for a population of third-grade students is (44.2, 54.2). Suppose you compute a 99% confidence interval using the same information. Which of the following statements is correct?

 (a) The intervals have the same width.

 (b) The 99% interval is shorter.

 (c) The 99% interval is longer.

 (d) The answer can’t be determined from the information given.

***FRQ***

11. A steel mill’s milling machine produces steel rods that are supposed to be 5 cm in diameter. When the machine is in statistical control, the rod diameters vary according to a Normal distribution with mean *µ* = 5 cm. A large sample of 150 rods produced by the machine yields a mean diameter of 5.005 cm and a standard deviation of 0.02 cm.

1. Construct and interpret a 99% confidence interval for the true mean diameter of the rods produced by the milling machine.
2. Does the interval in (a) give you reason to suspect that the machine is not producing rods of the correct diameter? Explain your reasoning.

12. A survey of a random sample of 1280 student loan borrowers found that 448 had loans totaling more than $20,000 for their undergraduate education.

 (a) Construct and interpret a 90% confidence interval for the population proportion *p.*

13. A random sample of 1100 teenagers (ages 12 to 17) were asked whether they played games online; 775 said that they did.

**a).** Construct and interpret a 99% confidence interval for the population proportion *p.*

**b.** How large a sample would you need to take to estimate *p* within 2% at a 99% confidence level? Show your work.