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| A.U. 2021-2022 | | | | | | | | | | |
| Devoir Examen Session : principale  de contrôle | | | | | | | | | | |
| Matière : Statistique Inférentielle | Nombre de pages : 4 | | | | | | | | | |
| Enseignant :Abdallah Khemais | Semestre :1 | | | | | | | | | |
| Niveau :M1 | Durée :1h30 | | | | | | | | | |
| Nom : | Prénom : | | | | | | | | | |
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**Directions: Answer Question in the space provided. Circle the correct choice for each response set. If required, show calculations in the blank spaces near the problems, or attach paper.**

***Provide an appropriate response.***

**1)** If selecting samples of size n = 10 from a population with a known mean and standard deviation, what requirement, if any, must be satisfied in order to assume that the distribution of the sample means is a normal distribution?

A) The population must have a normal distribution.

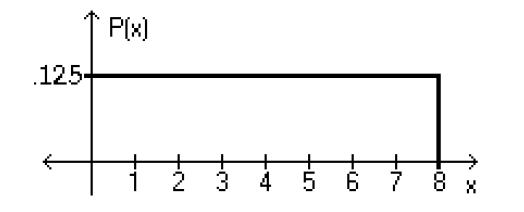
B) The population must have a standard deviation of 1.

C) The population must have a mean of 1.

D) None; the distribution of sample means will be approximately normal.

***Using the following uniform density curve, answer the question.***

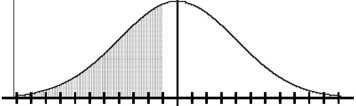
**2)** What is the probability that the random variable has a value greater than 3?



A) 0.575 B) 0.625 C)0.500 D)0.750

***Find the indicated z score. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.***

**3)** Shaded area is 0.4013.



A) 0.57 B) -0.57 C) 0.25 D) -0.25

***If z is a standard normal variable, find the probability.***

**4)** The probability that z lies between 0.7 and 1.98

A) 0.2175 B) 0.2181 C) -0.2181 D) 1.7341

***Solve the problem.***

**5)** For a standard normal distribution, find the percentage of data that are more than 1 standard deviation away from the mean.

A) 31.74% B) 68.26% C) 15.87% D) 34.13%

***Solve the problem. Round to the nearest tenth unless indicated otherwise.***

**6)** Scores on an English test are normally distributed with a mean of 33.8 and a standard deviation of 8.5. Find the score that separates the top 59% from the bottom 41%

A) 28.8 B) 38.8 C)31.8 D) 35.8

***Find the indicated probability.***

**7)** The diameters of bolts produced by a certain machine are normally distributed with a mean of 0.30 inches and a standard deviation of 0.01 inches. What percentage of bolts will have a diameter greater than 0.32 inches?

A) 97.72% B) 2.28% C)37.45% D) 47.72%

***Solve the problem***.

**8)** The amount of snowfall falling in a certain mountain range is normally distributed with a mean of 74 inches, and a standard deviation of 12 inches. What is the probability that the mean annual snowfall during 36 randomly picked years will exceed 76.8 inches?

A) 0.0026 B) 0.0808 C) 0.5808 D) 0.4192

**9)** A final exam in Math 160 has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is less than 76.

A) 0.8962 B) 0.0301 C) 0.9699 D) 0.9203

***The given values are discrete. Use the continuity correction and describe the region of the normal distribution that corresponds to the indicated probability.***

**10)** The probability of exactly 37 green marbles

A) The area between 36.5 and 37 B)The area between 37 and 37.5

C) The area between 36.5 and 37.5 D)The area between 36.5 and 38.5

***Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution.***

**11)** A certain question on a test is answered correctly by 22% of the respondents. Estimate the probability that among the next 150 responses there will be at most 40 correct answers.

A) 0.1003 B) 0.0694 C)0.9306 D)0.8997

***Express the confidence interval using the indicated format***.

**12)** Express the confidence interval -0.001< p< 0.559 in the form of p ± E.

A) 0.279 - 0.28 B) 0.279 ± 0.5 C) 0.279 ± 0.28 D) 0.28 ± 0.5

***Solve the problem.***

***Assume that a sample is used to estimate a population proportion p. Find the margin of error E that corresponds to the given statistics and confidence level. Round the margin of error to four decimal places.***

**13)** 90% confidence; n = 300, x = 50

A) 0.0354 B) 0.0443 C) 0.0422 D) 0.0380

***Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.***

**14)** n = 130, x = 65; 90% confidence

A) 0.426 < p < 0.574 B) 0.428 < p < 0.572

C) 0.432 < p < 0.568 D) 0.430 < p < 0.570

***Use the given data to find the minimum sample size required to estimate the population  
proportion.***

**15)** Margin of error: 0.003; confidence level: 94%; and unknown

A) 88,177 B) 98,301 C) 98,178 D) 98,171

***Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p.***

**16)** Of 375 randomly selected medical students, 30 said that they planned to work in a rural community. Find a 95% confidence interval for the true proportion of ail medical students who plan to work in a rural community.

A) 0.0439 < p < 0.116 B) 0.0570 < p < 0.103

C) 0.0525 < p < 0.107 D) 0.0474 < p < 0.113

***Use the confidence level and sample data to find a confidence interval for estimating the population p. Round your answer to the same number of decimal places as the sample mean.***

**17)** Test scores: n = 105, , ; 99% confidence

A) 69.0 < < 72.0 B) 68.8 < < 72.2

C) 69.2 < < 71.8 D) 69.4 < <71.6

***Do one of the following, as appropriate: (a) Find the critical value , (b) find the critical value (c) state that neither the normal nor the t distribution applies.***

**13)** 90%; n = 10; is unknown; population appears to be normally distributed.

A) = 1.812 B) = 2.262 C)= 1.383 D) = 1.833

***Use the given degree of confidence and sample data to construct a confidence interval for the population mean p. Assume that the population has a normal distribution.***

**18)** A savings and loan association needs information concerning the checking account balances of its local customers. A random sample of 14 accounts was checked and yielded a mean balance of $664.14 and a standard deviation of $297.29. Find a 98%  
confidence interval for the true mean checking account balance for local customers.

A) $455.65 < p < $872.63 C) $493.71 < p < $834.57

B) $492.52 < p < $835.76 D) $453.59 < p < $874.69

***Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation.***

***Assume that the population has a normal distribution. Round the  
confidence interval limits to the same number of decimal places as the sample standard deviation.***

**19)** To find the standard deviation of the diameter of wooden dowels, the manufacturer  
measures 19 randomly selected dowels and finds the standard deviation of the sample to  
be s = 0.16. Find the 95% confidence interval for the population standard deviation a.

A) 0.13 < < 0.22 B) 0.11 < < 0.25

C) 0.12 < < 0.24 D) 0.15 < < 0.21

***Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation . Assume that the population has a normal distribution. Round the  
confidence interval limits to one more decimal place than is used for the original set of data.***

**20)** The amounts (in ounces) of juice in eight randomly selected juice bottles are:

15.8 15.2 15.8 15.5  
15.4 15.2 15.9 15.6

A) 0.16 oz < < 0.56 oz C) 0.20 oz < < 0.76 oz

B) 0.17 oz < < 0.56 oz D) 0.17 oz < < 0.65 oz

***Express the null hypothesis and the alternative hypothesis in symbolic form. Use the corred symbol () for the indicated parameter.***

**21)** The manufacturer of a refrigerator System for beer kegs produces refrigerators that are supposed to maintain a true mean temperature, p, of 48°F, ideal for a certain type of German pilsner. The owner of the brewery does not agree with the refrigerator manufacturer, and claims he can prove that the true mean temperature is incorrect.

A) B) C) D)

***Find the value of the test statistic z using***

**22)** The claim is that the proportion of accident deaths of the elderly attributable to residential falls is more than 0.15, and the sample statistics include n = 900 deaths of the  
elderly with 20% of them attributable to residential falls.

A)-3.96 B)-4.20 C)3.96 D)4.20