Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Provide an appropriate response.

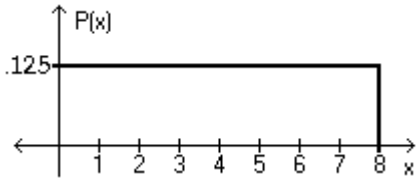
1) If selecting samples of size n = 10 from a population with a known mean and standard deviation, what requirement, if any, must be satisfied in order to assume that the distribution of the sample means is a normal distribution? 1) _____

A) The population must have a standard deviation of 1.
B) None; the distribution of sample means will be approximately normal.
C) The population must have a normal distribution.
D) The population must have a mean of 1.

2) If selecting samples of size n > 30 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? 2) _____

A) The population must have a standard deviation of 0.
B) The mean must be equal to the standard deviation.
C) The population must have a normal distribution.
D) None; the distribution of sample means will be approximately normal.

Using the following uniform density curve, answer the question.



3) What is the probability that the random variable has a value greater than 3.3? 3) _____

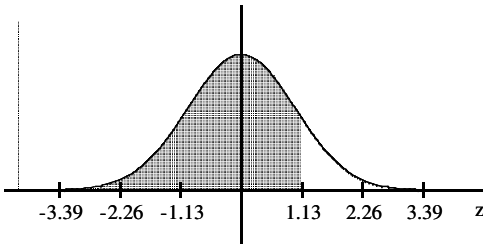
A) 0.7125 B) 0.4625 C) 0.5375 D) 0.5875

4) What is the probability that the random variable has a value less than 6.1? 4) _____

A) 0.5125 B) 0.7625 C) 0.6375 D) 0.8875

Find the area of the shaded region. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.

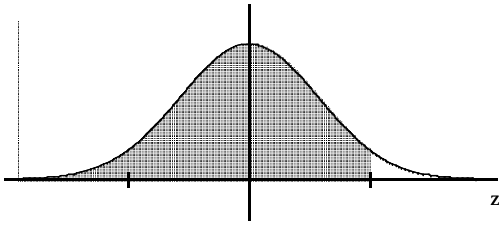
5) 5) _____



A) 0.8485 B) 0.8708 C) 0.1292 D) 0.8907

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

6) Shaded area is 0.9599. 6) _____



A) 1.75 B) 1.82 C) –1.38 D) 1.03

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

7) The probability that z lies between –2.41 and 0 7) _____

A) 0.5080 B) 0.4920 C) 0.4910 D) 0.0948

The Precision Scientific Instrument Company manufactures thermometers that are supposed to give readings of 0°C at the freezing point of water. Tests on a large sample of these thermometers reveal that at the freezing point of water, some give readings below 0°C (denoted by negative numbers) and some give readings above 0°C (denoted by positive numbers). Assume that the mean reading is 0°C and the standard deviation of the readings is 1.00°C. Also assume that the frequency distribution of errors closely resembles the normal distribution. A thermometer is randomly selected and tested. Find the temperature reading corresponding to the given information.

8) Find P_{40}, the 40th percentile. 8) _____

A) 0.25° B) –0.57° C) –0.25° D) 0.57°

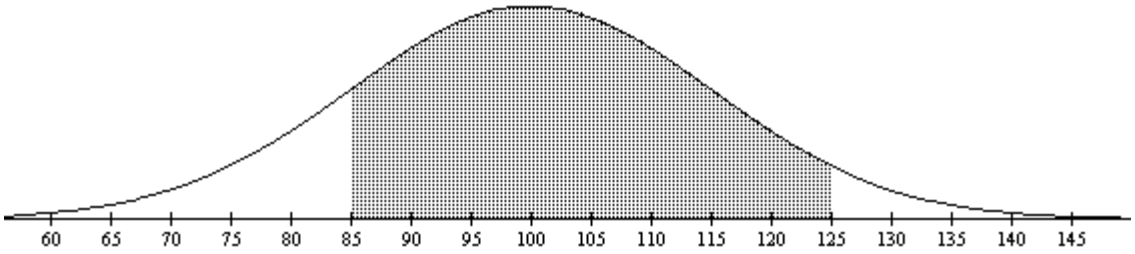
Find the indicated value.

9) $z_{0.36}$ 9) _____

A) 1.60 B) 0.36 C) 0.45 D) 1.76

Provide an appropriate response.

10) Find the area of the shaded region. The graph depicts IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15 (as on the Wechsler test). 10) _____



A) 0.7303 B) 0.7745 C) 0.7619 D) 0.7938

Assume that X has a normal distribution, and find the indicated probability.

11) The mean is $\mu = 15.2$ and the standard deviation is $\sigma = 0.9$. 11) _____

Find the probability that X is greater than 15.2.

A) 0.5000 B) 1.0000 C) 0.0003 D) 0.9998

Solve the problem.

12) The amount of snowfall falling in a certain mountain range is normally distributed with a mean of 89 inches, and a standard deviation of 14 inches. What is the probability that the mean annual snowfall during 49 randomly picked years will exceed 91.8 inches? 12) _____

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

Find the indicated critical z value.

13) Find the critical value $z_{\alpha/2}$ that corresponds to a 91% confidence level. 13) _____

A) 1.75 B) 1.34 C) 1.70 D) 1.645

Express the confidence interval using the indicated format.

14) Express the confidence interval $0.62 < p < 0.72$ in the form of $\hat{p} \pm E$. 14) _____

A) 0.62 ± 0.1 B) 0.67 ± 0.1 C) 0.62 ± 0.05 D) 0.67 ± 0.05

Solve the problem.

15) The following confidence interval is obtained for a population proportion, p: $0.686 < p < 0.712$. Use these confidence interval limits to find the point estimate, $\hat{p}$. 15) _____

A) 0.704 B) 0.686 C) 0.699 D) 0.694

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.

16) 90% confidence; n = 430, x = 80 16) _____

A) 0.0386 B) 0.0309 C) 0.0331 D) 0.0368

17) 99% confidence; the sample size is 1180, of which 45% are successes 17) _____

A) 0.0284 B) 0.0337 C) 0.0297 D) 0.0373

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

18) n = 96, x = 43; 98% confidence 18) _____

A) $0.329 < p < 0.567$ B) $0.330 < p < 0.566$

C) $0.349 < p < 0.547$ D) $0.348 < p < 0.548$

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

19) Margin of error: 0.018; confidence level: 99%; $\hat{p}$ and $\hat{q}$ unknown 19) _____

A) 4114 B) 4966 C) 5117 D) 7116

20) Margin of error: 0.04; confidence level: 99%; from a prior study, $\hat{p}$ is estimated by 0.14. 20) _____

A) 20 B) 599 C) 289 D) 499

Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.

21) 91%; n = 45; σ is known; population appears to be very skewed. 21) _____

A) $z_{\alpha/2} = 1.75$ B) $t_{\alpha/2} = 1.645$ C) $z_{\alpha/2} = 1.70$ D) $t_{\alpha/2} = 1.34$

Express the null hypothesis and the alternative hypothesis in symbolic form. Use the correct symbol(μ, p, σ) for the indicated parameter.

22) A skeptical paranormal researcher claims that the proportion of Americans that have seen a UFO, p, is less than 2 in every one thousand. 22) _____

A) $H_0: p > 0.002$ $H_1: p \leq 0.002$
B) $H_0: p < 0.002$ $H_1: p \geq 0.002$
C) $H_0: p = 0.002$ $H_1: p > 0.002$
D) $H_0: p = 0.002$ $H_1: p < 0.002$

23) The owner of a football team claims that the average attendance at games is over 63,500, and he is therefore justified in moving the team to a city with a larger stadium. 23) _____

A) $H_0: \mu = 63{,}500$ $H_1: \mu < 63{,}500$
B) $H_0: \mu > 63{,}500$ $H_1: \mu \leq 63{,}500$
C) $H_0: \mu < 63{,}500$ $H_1: \mu \geq 63{,}500$
D) $H_0: \mu = 63{,}500$ $H_1: \mu > 63{,}500$

Assume that the data has a normal distribution and the number of observations is greater than fifty. Find the critical z value used to test a null hypothesis.

24) $\alpha = 0.09$ for a right–tailed test. 24) _____

A) 1.96 B) ±1.34 C) ±1.96 D) 1.34

25) $\alpha = 0.05$ for a left–tailed test. 25) _____

A) ±1.645 B) –1.96 C) ±1.96 D) –1.645

26) $\alpha = 0.1$ for a two–tailed test. 26) _____

A) ±1.645 B) ±2.33 C) ±1.4805 D) ±2.052

Use the given information to find the P–value. Also, use a 0.05 significance level and state the conclusion about the null hypothesis (reject the null hypothesis or fail to reject the null hypothesis).

27) The test statistic in a right–tailed test is $z = 1.43$. 27) _____

A) 0.0764; fail to reject the null hypothesis
B) 0.1528; fail to reject the null hypothesis
C) 0.0764; reject the null hypothesis
D) 0.1528; reject the null hypothesis

Assume that a hypothesis test of the given claim will be conducted. Identify the type I or type II error for the test.

28) A psychologist claims that more than 3% of adults suffer from extreme shyness. Identify the type II error for the test. 28) _____

A) Fail to reject the claim that the percentage of adults who suffer from extreme shyness is equal to 3% when that percentage is actually less than 3%.
B) Reject the claim that the percentage of adults who suffer from extreme shyness is equal to 3% when that percentage is actually 3%.
C) Fail to reject the claim that the percentage of adults who suffer from extreme shyness is equal to 3% when that percentage is actually greater than 3%.
D) Reject the claim that the percentage of adults who suffer from extreme shyness is equal to 3% when that percentage is actually greater than 3%.

29) A consumer advocacy group claims that the mean mileage for the Carter Motor Company's new sedan is less than 21 miles per gallon. Identify the type I error for the test. 29) _____

A) Fail to reject the claim that the mean is equal to 21 miles per gallon when it is actually greater than 21 miles per gallon.

B) Reject the claim that the mean is equal to 21 miles per gallon when it is actually 21 miles per gallon.

C) Fail to reject the claim that the mean is equal to 21 miles per gallon when it is actually less than 21 miles per gallon.

D) Reject the claim that the mean is equal to 21 miles per gallon when it is actually less than 21 miles per gallon.

Answer Key
Testname: TEST04STUDYGUIDE

1) C
2) D
3) D
4) B
5) B
6) A
7) B
8) C
9) B
10) D
11) A
12) C
13) C
14) D
15) C
16) B
17) D
18) B
19) C
20) D
21) C
22) D
23) D
24) D
25) D
26) A
27) A
28) C
29) B