Name: _____ **Class:** _____ **Date:** _____ **ID: A**

E205 Final: Version B

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. The owner of a local nightclub has recently surveyed a random sample of $n = 300$ customers of the club. She would now like to determine whether or not the mean age of her customers is over 35. If so, she plans to alter the entertainment to appeal to an older crowd. If not, no entertainment changes will be made. If she wants to be 99% confident in her decision, what rejection region she use if the population standard deviation σ is known?
   a. Reject H_0 if $z < -2.33$
   b. Reject H_0 if $z < -2.58$
   c. Reject H_0 if $z > 2.33$
   d. Reject H_0 if $z > 2.58$

____ 2. For a two-tail test, the null hypothesis will be rejected at the 0.05 level of significance if the value of the standardized test statistic z is:
   a. smaller than 1.96 or greater than −1.96
   b. greater than −1.96 or smaller than 1.96
   c. smaller than −1.96 or greater than 1.96
   d. greater than 1.645 or less than −1.645

____ 3. In a simple linear regression problem, the following sum of squares are produced: $\sum (y_i - \bar{y})^2 = 200$, $\sum (y_i - \hat{y}_i)^2 = 50$, and $\sum (\hat{y}_i - \bar{y})^2 = 150$. The percentage of the variation in y that is explained by the variation in x is:
   a. 25%
   b. 75%
   c. 33%
   d. 50%

____ 4. In simple linear regression, most often we perform a two-tail test of the population slope β_1 to determine whether there is sufficient evidence to infer that a linear relationship exists. The null hypothesis is stated as:
   a. H_0: $\beta_1 = 0$
   b. H_0: $\beta_1 = b_1$
   c. H_0: $\beta_1 \neq 0$
   d. None of these choices.

____ 5. From a sample of 400 items, 14 are found to be defective. The point estimate of the population proportion defective will be:
   a. 14
   b. 0.035
   c. 28.57
   d. 0.05

____ 6. The rejection region for testing H_0: $\mu = 100$ vs. H_1: $\mu \neq 100$, at the 0.05 level of significance is:
a. $|z| < 0.95$
b. $|z| > 1.96$
c. $z > 1.65$
d. $z < 2.33$

____ 7. If the coefficient of determination is 0.975, then which of the following is true regarding the slope of the regression line?
a. All we can tell is that it must be positive.
b. It must be 0.975.
c. It must be 0.987.
d. Cannot tell the sign or the value.

____ 8. Suppose an interval estimate for the population mean was 62.84 to 69.46. The population standard deviation was assumed to be 6.50, and a sample of 100 observations was used. The mean of the sample was:
a. 56.34
b. 62.96
c. 6.62
d. 66.15

____ 9. Researchers claim that 60 tissues is the average number of tissues a person uses during the course of a cold. The company who makes Kleenex brand tissues thinks that fewer of their tissues are needed. What are their null and alternative hypotheses?
a. H_0: $\mu = 60$ vs. H_1: $\mu > 60$
b. H_0: $\mu = 60$ vs. H_1: $\mu < 60$
c. H_0: $\overline{X} = 60$ vs. H_1: $\overline{X} < 60$
d. H_0: $\mu < 60$ vs. H_1: $\mu = 60$

____ 10. If a test of hypothesis has a Type I error probability of .05, this means that:
a. if the null hypothesis is true, we don't reject if 5% of the time.
b. if the null hypothesis is true, we reject it 5% of the time.
c. if the null hypothesis is false, we don't reject it 5% of the time.
d. if the null hypothesis is false, we reject it 5% of the time.

____ 11. Which of the following *p*-values will lead us to reject the null hypothesis if the level of significance equals 0.05?
a. 0.150
b. 0.100
c. 0.051
d. 0.025

____ 12. In the simple linear regression model, the *y*-intercept represents the:
a. change in *y* per unit change in *x*.
b. change in *x* per unit change in *y*.
c. value of *y* when $x = 0$.
d. value of *x* when $y = 0$.

____ 13. The hypothesis of most interest to the researcher is:
a. the alternative hypothesis.
b. the null hypothesis.
c. both hypotheses are of equal interest.
d. Neither hypothesis is of interest.

____ 14. For the following multiple regression model: $\hat{y} = 2 - 3x_1 + 4x_2 + 5x_3$, a unit increase in x_1, holding x_2 and x_3 constant, results in:
a. an increase of 3 units on average in the value of *y*.
b. a decrease of 3 units on average in the value of *y*.
c. an increase of 8 units in the value of *y*.
d. None of these choices.

____ 15. If the coefficient of correlation is –0.60, then the coefficient of determination is:
a. –0.60
b. –0.36
c. 0.36
d. 0.77

____ 16. If the lower and upper confidence limits of the population proportion *p*, using a sample of size 1500, are 0.184 and 0.238, respectively, then the lower and upper confidence limits of the total number of successes in the population, given that the population size is 750,000, are respectively:
a. 276 and 357
b. 137,724 and 178,143
c. 138,000 and 178,500
d. 138,276 and 179,857

____ 17. In performing a regression analysis which of the following must be true about the distribution of the error variable?
a. The distribution is normal with mean zero.
b. The errors associated with one *y* value are independent of errors associated with another *y* value.
c. The standard deviation is constant for each value of *x*.
d. All of these choices are true.

____ 18. A professor of statistics refutes the claim that the average student spends 3 hours studying for the midterm exam. She thinks they spend more time than that. Which hypotheses are used to test the claim?
a. H_0: $\mu \neq 3$ vs. H_1: $\mu > 3$
b. H_0: $\mu = 3$ vs. H_1: $\mu \neq 3$
c. H_0: $\mu \neq 3$ vs. H_1: $\mu = 3$
d. H_0: $\mu = 3$ vs. H_1: $\mu < 3$

____ 19. For the multiple regression model: $\hat{y} = 75 + 25x_1 - 15x_2 + 10x_3$, if x_2 were to increase by 5, holding x_1 and x_3 constant, the value of *y* will:
a. increase by 5.
b. increase by 75.
c. decrease on average by 5.
d. decrease on average by 75.

____ 20. After calculating the sample size needed to estimate a population proportion to within W=0.04, your statistics professor told you the maximum allowable error must be reduced to just W=0.01. If the original calculation led to a sample size of n=800, the sample size will now have to be:
a. 800
b. 3200
c. 12,800
d. 6400

____ 21. A random sample of size 15 taken from a normally distributed population revealed a sample mean of 75 and a sample variance of 25. The upper limit of a 95% confidence interval for the population mean would equal:
a. 77.77
b. 72.23
c. 88.85
d. 77.27

____ 22. The coefficient of correlation is used to determine:
a. the strength of the linear relationship between *x* and *y*.
b. the least squares estimates of the regression parameters.
c. the predicted value of *y* for a given value of *x*.
d. All of these choices.

____ 23. Use your results from Model 1,2,3, and 4 to answer these questions.
The coefficient estimate on weight for Model 1 is
a. 0.05549
b. -0.05549
c. -0.05449
d. -0.05149

____ 24. Use your results from Model 1,2,3, and 4 to answer these questions.
According to these data, are women less intelligent than men.
a. Yes, according to Model 1
b. Yes, according to Model 2
c. No, according to Model 4
d. No, none of the Models predicts this

____ 25. Use your results from Model 1,2,3, and 4 to answer these questions.
Is the size of the brain a predictor for intelligence?
a. Yes, at the 1, 5, and 10 % significance level
b. Yes, at the 5% and 10% significance level only
c. Yes, at the 10% only significance level
d. No, it's not a predictor

____ 26. Use your results from Model 1,2,3, and 4 to answer these questions.
According to the coefficient of determination, which one is the 'best' model?
a. Model 1
b. Model 2
c. Model 3
d. We cannot compare all the models because some have different dependent variables and therefore explain different things

____ 27. Use your results from Model 1,2,3, and 4 to answer these questions.
Go to Model 4 and calculate the standard deviation of the residuals.
Hint: You can find the residual column at the bottom of your regression output, between the 'Predicted performance IQ' column and the 'Standard Residuals' column. What is this standard deviations of the residuals.

a. 18.57338549
b. 18.67338549
c. 18.77338549
d. 18.87338549

____ 28. Use your results from Model 1,2,3, and 4 to answer these questions.
Use Model 1 and predict the full IQ score of a male with

size	weight	height
900000	172	78

a. 85.46399
b. 85.36399
c. 85.26399
d. 85.16399

____ 29. Use your results from Model 1,2,3, and 4 to answer these questions.
Use Model 1 and predict the full IQ score of a female with

size	weight	height
900000	172	78

a. 82.62731
b. 82.72731
c. 82.82731
d. 82.92731

____ 30. As a general rule, the normal distribution is used to approximate the sampling distribution of the sample proportion only if:
a. the sample size n is greater than 30.
b. the population proportion p is close to 0.50.
c. the underlying population is normal.
d. np and $n(1 - p)$ are both greater than or equal to 5.

____ 31. An infinite population has a mean of 40 and a standard deviation of 15. A sample of size 100 is taken at random from this population. The standard error of the sample mean equals:
a. 15
b. 15/100
c. $15/\sqrt{100}$
d. None of these choices.

____ 32. A sample of size 40 is taken from an infinite population whose mean and standard deviation are 68 and 12, respectively. The probability that the sample mean is larger than 70 equals
a. $P(Z > 70)$
b. $P(Z > 2)$
c. $P(Z > 0.17)$
d. $P(Z > 1.05)$

____ 33. In a multiple regression analysis, if the model provides a poor fit, this indicates that:
a. the sum of squares for error will be large.
b. the standard error of estimate will be large.
c. the coefficient of determination will be close to zero.
d. All of these choices are true.

____ 34. In a multiple regression model, the standard deviation of the error variable ε is assumed to be:
a. constant.
b. 0.
c. 1.0.
d. None of these choices.

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Answer Section

MULTIPLE CHOICE

1.	ANS: C	PTS: 1	REF:	SECTION 11.2
2.	ANS: C	PTS: 1	REF:	SECTION 11.2
3.	ANS: B	PTS: 1	REF:	SECTION 16.3-16.4
4.	ANS: A	PTS: 1	REF:	SECTION 16.3-16.4
5.	ANS: B	PTS: 1	REF:	SECTION 12.3
6.	ANS: B	PTS: 1	REF:	SECTION 11.2
7.	ANS: D	PTS: 1	REF:	SECTION 16.3-16.4
8.	ANS: D	PTS: 1	REF:	SECTION 10.2
9.	ANS: B	PTS: 1	REF:	SECTION 11.1
10.	ANS: B	PTS: 1	REF:	SECTION 11.1
11.	ANS: D	PTS: 1	REF:	SECTION 11.2
12.	ANS: C	PTS: 1	REF:	SECTION 16.1-16.2
13.	ANS: A	PTS: 1	REF:	SECTION 11.1
14.	ANS: B	PTS: 1	REF:	SECTION 17.1-17.2
15.	ANS: C	PTS: 1	REF:	SECTION 16.3-16.4
16.	ANS: C	PTS: 1	REF:	SECTION 12.4-12.5
17.	ANS: D	PTS: 1	REF:	SECTION 16.3-16.4
18.	ANS: A	PTS: 1	REF:	SECTION 11.1
19.	ANS: D	PTS: 1	REF:	SECTION 17.1-17.2
20.	ANS: C	PTS: 1	REF:	SECTION 12.3
21.	ANS: A	PTS: 1	REF:	SECTION 12.1
22.	ANS: A	PTS: 1	REF:	SECTION 16.3-16.4
23.	ANS: B	PTS: 1		
24.	ANS: D	PTS: 1		
25.	ANS: ~~B~~ A	PTS: 1		
26.	ANS: D	PTS: 1		
27.	ANS: B	PTS: 1		
28.	ANS: D	PTS: 1		
29.	ANS: B	PTS: 1		
30.	ANS: D	PTS: 1	REF:	SECTION 9.2
31.	ANS: C	PTS: 1	REF:	SECTION 9.1
32.	ANS: D	PTS: 1	REF:	SECTION 9.1
33.	ANS: D	PTS: 1	REF:	SECTION 17.1-17.2
34.	ANS: A	PTS: 1	REF:	SECTION 17.1-17.2