Name: _____   Date:

Course: MAT 330   NYACK COLLEGE

Exam #3:   Chapters 7-9

Multiple Choice (5 points each question # 1-30)

Directions: Make one selection for each question (unless otherwise stated).

1.   The sampling distribution is the probability distribution of a:

   A)   sample   C)   sample without replacement

   B)   sample with replacement   D)   sample statistic

2.   The probability distribution of a sample statistic is the:

   A)   frequency distribution of that statistic   C) sampling distribution of that statistic

   B)   binomial distribution of that statistic   D)   Poisson distribution of that statistic

3.   The sampling error is:

   A) an error that occurs during collection, recording, and tabulation of data

   B) the difference between the value of a sample statistic and the value of the corresponding population parameter

   C) an error that occurs when a sample of fewer than 30 members is drawn

   D) an error that occurs when a sample of 30 or more members is drawn

4. An error that occurs because of chance is called:

   A) nonsampling error   B) sampling error   C) mean error   D) probability error

5.   An error that occurs because of human mistakes is called:

   A) nonsampling error   B) sampling error   C) mean error   D) probability error

6. The mean age of all students at a university is 24 years. The mean age of a random sample of 100 students selected from this university is 23.6 years. The difference (23.6 - 24 = -0.4) is the:
    A)   probability error   C)   sampling error
    B)   nonsampling error   D)   population error

7. The mean weekly earnings of all employees of a company are $822. The mean weekly earnings of a random sample of 25 employees selected from this company is $837. The difference ($837 - $822 = $15) is the:

    A)   probability error   C)   sampling error
    B)   nonsampling error   D)   population error

8. The mean of the sampling distribution of the sample mean is:
    A)   always equal to the sample mean
    B)   sometimes equal to the population mean
    C)   always equal to the population mean
    D)   always equal to the sampling procedure

9. If $\frac{n}{N}$ is less than or equal to 0.05, the standard deviation of the sampling distribution of the sample mean is equal to the population standard deviation:
    A)   divided by the square of the sample size
    B)   divided by the sample size
    C)   divided by the square root of the sample size
    D)   multiplied by the sample size

10. Estimation is a procedure by which we assign a numerical value or numerical values to the:
    A)   population parameter based on the information collected from a sample
    B)   sample statistic based on the information collected from a sample
    C)   population parameter based on the information collected from a population
    D)   sample statistic based on the information collected from a population

11. The values assigned to a population parameter based on the value(s) of a sample statistic are:
    A)   the probabilities   C)   a sampling distribution
    B)   the probability distribution   D)   estimate(s)

12. The sample statistic used to estimate a population parameter is a(n):

    A) random variable   B) qualitative variable   C) estimator   D) parameter

13. The single value of a sample statistic that we assign to the population parameter is a:

    A) single estimate   B) unique estimate   C) point estimate   D) singular

14. The confidence level of an interval estimate is denoted by:

    A) α B) $(1-\alpha)\times100\%$ C) β D) $(1-\beta)\times100\%$

15. For most distributions, we can use the normal distribution to make a confidence interval for a population mean provided that the population standard deviation is known and the sample size is:

    A)   greater than 30   C)   greater than or equal to 30

    B)   less than 25   D)   greater than 100

16. The margin of error for the population mean, assuming σ is known, is:

    A)   z multiplied by the population standard deviation

    B)   z multiplied by t

    C)   z multiplied by the standard deviation of the sample mean

    D)   z multiplied by the sample mean

17. The z value for a 90% confidence interval for the population mean with σ known is:

    A) 2.05   B) 1.645   C) 2.17   D) 1.60

18. The z value for a 85% confidence interval for the population mean with σ known is:

    A) 1.96   B) 2.33   C) 1.44   D) 2.58

19. The width of a confidence interval depends on the size of the:

    A) population mean   B) margin of error   C) sample mean   D) none of these

20. The null hypothesis is a claim about a:

    A)   parameter, where the claim is assumed to be false until it is declared true

    B)   parameter, where the claim is assumed to be true until it is declared false

    C)   statistic, where the claim is assumed to be false until it is declared true

    D)   statistic, where the claim is assumed to be true until it is declared false

21. The alternative hypothesis is a claim about a:

    A)   parameter, where the claim is assumed to be true until it is declared false

    B)   parameter, where the claim is assumed to be true if the null hypothesis is declared false

    C)   statistic, where the claim is assumed to be true if the null hypothesis is declared false

    D)   statistic, where the claim is assumed to be false until it is declared true

22. In a one-tailed hypothesis test, a critical point is a point that divides the area under the sampling distribution of a:
    A)   statistic into one rejection region and one nonrejection region
    B)   parameter into one rejection region and one nonrejection region
    C)   statistic into one rejection region and two nonrejection regions
    D)   parameter into two rejection regions and one nonrejection region

23. In a hypothesis test, a Type I error occurs when:
    A)   a false null hypothesis is rejected   C)   a false null hypothesis is not rejected
    B)   a true null hypothesis is not rejected   D)   a true null hypothesis is rejected

24. In a hypothesis test, a Type II error occurs when:
    A)   a false null hypothesis is rejected   C)   a false null hypothesis is not rejected
    B)   a true null hypothesis is not rejected   D)   a true null hypothesis is rejected

25. In a hypothesis test, the probability of committing a Type I error is called the:
    A) confidence level   B) confidence interval   C) significance level   D) beta error

26. A one-tailed hypothesis test contains:
    A)   one rejection region and two nonrejection regions
    B)   two rejection regions and one nonrejection region
    C)   two rejection regions and two nonrejection regions
    D)   one rejection region and one nonrejection region

27. In a left-tailed hypothesis test, the sign in the alternative hypothesis is:
    A) not equal to $(\neq)$ C)   less than $(<)$

    B) greater than $(>)$ D)   less than or equal to $(\leq)$

28. In a two-tailed hypothesis test, the sign in the alternative hypothesis is:
    A) not equal to $(\neq)$ C)   less than $(<)$

    B) greater than $(>)$ D)   less than or equal to $(\leq)$

29. In a right-tailed hypothesis test, the sign in the alternative hypothesis is:
    A) not equal to $(\neq)$ C)   less than $(<)$

    B) greater than $(>)$ D)   less than or equal to $(\leq)$

30. A researcher wants to test if the mean price of houses in an area is greater than \$145,000. The alternative hypothesis for this example will be that the population mean is:
    A)   equal to \$145,000   C)   greater than or equal to \$145,000
    B)   not equal to \$145,000 D)   greater than \$145,000

Short Response (10 points for each question # 31-36)

31.   The mean price of all magazines published in the United States is $3.65. The mean price of a random sample of 16 magazines is $4.30. The sampling error is:

32. A population contains 8 members. The total number of samples of size 4 that you can select (without replacement) from this population is:

33. A sample of size 65 from a population having standard deviation $\sigma = 55$ produced a mean of 234.00. The 95% confidence interval for the population mean (rounded to two decimal places) .

      a.   What is the lower limit?
      b.   What is the upper limit?

34. A researcher wants to make a 95% confidence interval for a population mean. She wants the margin of error to be within 1.9 of the population mean. The population standard deviation is 11.07. The sample size that will yield a margin of error within 1.9 of the population mean is:

35. A two-tailed hypothesis test using the normal distribution reveals that the area under the sampling distribution curve of the mean and located to the right of the sample mean equals 0.032. Consequently, the *p*-value for this test equals:

36. In a hypothesis test with hypotheses $H_0 : \mu \geq 37$ and $H_1 : \mu < 37$, a random sample of 59 elements selected from the population produced a mean of 35.8. Assuming that $\sigma = 9.9$, what is the approximate *p*-value for this test? (round your answer to four decimal places)

Extended Response (20 points for each question #37-38)

37.   A researcher wants to test if the mean price of houses in an area is greater than $145,000. A random sample of 35 houses selected from the area produces a mean price of $149,700. Assume that $\sigma = \$13,100$, and that the test is to be made at the 1% significance level.

   a.   What is the critical value of z?

   A) 1.88   B) 2.17   C) 1.96   D) 2.58

   b.   What is the value of the test statistic, z, rounded to three decimal places?

   c. What is the p-value for this hypothesis test, rounded to four decimal places?

   d.   Should you reject or fail to reject the null hypothesis in this test? (State your answer as "reject" or "fail to reject", but don't include the quotation marks.)

38. The Labor Bureau wants to estimate, at a 90% confidence level, the proportion of all households that receive welfare. A preliminary sample showed that 18.5% of households in this sample receive welfare. The sample size that would limit the margin of error to be within 0.036 of the population proportion is: