Final Exam Review: chs 6, 7, 8

1. X is a normally distributed random variable with a mean of 5 and a variance of 4. The probability that X is greater than 10.52 is
   a. 0.9971
   b. 0.4971
   c. 0.0029
   d. 0.0838

2. Z is a standard normal random variable. What is the value of Z if the area to the right of Z is 0.1112?
   a. 1.22
   b. 3.22
   c. 2.22
   d. 0.3888

Case Study G
The weight of football players is normally distributed with a mean of 200 pounds and a standard deviation of 25 pounds.

3. Refer to Case Study G. The probability of a player weighing more than 241.25 pounds is
   a. 0.0495
   b. 0.9010
   c. 0.9505
   d. 0.4505

4. The function f(x) = (1/10) e^{-x/10} x \geq 0 is used in
   a. poisson probability distributions
   b. hyper-geometric probability distributions
   c. exponential probability distributions
   d. normal probability distributions

Case Study H
The starting salaries of individuals with an MBA degree are normally distributed with a mean of $40,000 and a standard deviation of $5,000.

5. Refer to Case Study H. What is the probability that a randomly selected individual with an MBA degree will get a starting salary of at least $30,000?
   a. 0.0228
   b. 0.5000
   c. 0.9772
   d. 0.4772

6. Refer to Case Study H. What is the probability that a randomly selected individual with an MBA degree will get a starting salary of at least $47,500?
   a. 0.9332
   b. 0.4332
   c. 0.5000
   d. 0.0668
7. Refer to Case Study H. What percentage of MBA's will have starting salaries of $34,000 to $46,000?
   a. 38.59%
   b. 50%
   c. 76.98%
   d. 38.49%

Case Study I
The weight of items produced by a machine is normally distributed with a mean of 8 ounces and a standard deviation of 2 ounces.

8. Refer to Case Study I. What is the probability that a randomly selected item will weigh more than 10 ounces?
   a. 0.1587
   b. 0.3413
   c. 0.5000
   d. 0.8413

Case Study J
Consider the continuous random variable X, which has a uniform distribution over the interval from 20 to 28.

9. Refer to Case Study J. The variance of X is approximately
   a. 0.667
   b. 5.333
   c. 2.309
   d. 32

10. Refer to Case Study J. The probability that X will take on a value between 21 and 25 is
    a. 0.500
    b. 0.125
    c. 0.250
    d. 1.000

11. The ages of students at a university are normally distributed with a mean of 21. What percentage of the student body is at least 21 years old?
    a. 21%
    b. It could be any value, depending on the magnitude of the standard deviation
    c. 1.96%
    d. 50%

12. The probability density function for a uniform distribution ranging between 2 and 6 is
    a. 4
    b. undefined
    c. any positive value
    d. 0.25

13. Larger values of the standard deviation result in a normal curve that is
    a. shifted to the right
    b. shifted to the left
    c. narrower and more peaked
    d. wider and flatter
Exhibit 6-4

\[ f(x) = (1/10) e^{-x/10}, \quad x \geq 0 \]

14. Refer to Exhibit 6-4. The mean of \( x \) is
   a. 0.10
   b. 10
   c. 100
   d. 1,000

15. Refer to Exhibit 6-4. The probability that \( x \) is between 3 and 6 is
   a. 0.4512
   b. 0.1920
   c. 0.2592
   d. 0.6065

16. From a group of 12 students, we want to select a random sample of 4 students to serve on a university committee. How many different random samples of 4 students can be selected?
   a. 48
   b. 20,736
   c. 16
   d. 495

17. Parameters are
   a. numerical characteristics of a sample
   b. numerical characteristics of a population
   c. the averages taken from a sample
   d. numerical characteristics of either a sample or a population

18. Sampling distribution of \( \bar{x} \) is the
   a. probability distribution of the sample mean
   b. probability distribution of the sample proportion
   c. mean of the sample
   d. mean of the population

19. A simple random sample of 100 observations was taken from a large population. The sample mean and the standard deviation were determined to be 80 and 12 respectively. The standard error of the mean is
   a. 1.20
   b. 0.12
   c. 8.00
   d. 0.80

20. The probability distribution of all possible values of the sample proportion \( \bar{p} \) is the
   a. probability density function of \( \bar{p} \)
   b. sampling distribution of \( x \)
   c. same as \( p \), since it considers all possible values of the sample proportion
   d. sampling distribution of \( p \)

21. Since the sample size is always smaller than the size of the population, the sample mean
   a. must always be smaller than the population mean
   b. must be larger than the population mean
   c. must be equal to the population mean
   d. can be smaller, larger, or equal to the population mean
22. In point estimation
   a. data from the population is used to estimate the population parameter
   b. data from the sample is used to estimate the population parameter
   c. data from the sample is used to estimate the sample statistic
   d. the mean of the population equals the mean of the sample

23. The sample statistic \( \bar{x} \) is the point estimator of
   a. \( \mu \)
   b. \( \sigma \)
   c. \( \mu \)
   d. \( \sigma \)

24. The expected value of the random variable \( \bar{x} \) is
   a. the standard error
   b. the sample size
   c. the size of the population
   d. None of these alternatives is correct.

25. As the sample size becomes larger, the sampling distribution of the sample mean approaches a
   a. binomial distribution
   b. Poisson distribution
   c. normal distribution
   d. chi-square distribution

26. A population has a mean of 300 and a standard deviation of 18. A sample of 144 observations will be taken. The probability that the sample mean will be between 297 to 303 is
   a. 0.4332
   b. 0.9544
   c. 0.9332
   d. 0.0668

27. A simple random sample of 64 observations was taken from a large population. The sample mean and the standard deviation were determined to be 320 and 120 respectively. The standard error of the mean is
   a. 1.875
   b. 40
   c. 5
   d. 15

28. Random samples of size 81 are taken from an infinite population whose mean and standard deviation are 200 and 18, respectively. The distribution of the population is unknown. The mean and the standard error of the mean are
   a. 200 and 18
   b. 81 and 18
   c. 9 and 2
   d. 200 and 2

29. Random samples of size 525 are taken from an infinite population whose population proportion is 0.3. The standard deviation of the sample proportions (i.e., the standard error of the proportion) is
   a. 0.0004
   b. 0.2100
   c. 0.3000
   d. 0.0200
30. For a population with any distribution, the form of the sampling distribution of the sample mean is
   a. sometimes normal for all sample sizes
   b. sometimes normal for large sample sizes
   c. always normal for all sample sizes
   d. always normal for large sample sizes

31. A sample of 51 observations will be taken from an infinite population. The population proportion equals 0.85. The probability that the sample proportion will be between 0.9115 and 0.946 is
   a. 0.8633
   b. 0.6900
   c. 0.0819
   d. 0.0345

32. As the sample size increases, the variability among the sample means
   a. increases
   b. decreases
   c. remains the same
   d. depends upon the specific population being sampled

**Exhibit 7-2**
A random sample of 10 examination papers in a course, which was given on a pass or fail basis, showed the following scores.

<table>
<thead>
<tr>
<th>Paper Number</th>
<th>Grade</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>65</td>
<td>Pass</td>
</tr>
<tr>
<td>2</td>
<td>87</td>
<td>Pass</td>
</tr>
<tr>
<td>3</td>
<td>92</td>
<td>Pass</td>
</tr>
<tr>
<td>4</td>
<td>35</td>
<td>Fail</td>
</tr>
<tr>
<td>5</td>
<td>79</td>
<td>Pass</td>
</tr>
<tr>
<td>6</td>
<td>100</td>
<td>Pass</td>
</tr>
<tr>
<td>7</td>
<td>48</td>
<td>Fail</td>
</tr>
<tr>
<td>8</td>
<td>74</td>
<td>Pass</td>
</tr>
<tr>
<td>9</td>
<td>79</td>
<td>Pass</td>
</tr>
<tr>
<td>10</td>
<td>91</td>
<td>Pass</td>
</tr>
</tbody>
</table>

33. Refer to Exhibit 7-2. The point estimate for the mean of the population is
   a. 750
   b. 100
   c. 85
   d. 75

34. Refer to Exhibit 7-2. The point estimate for the standard deviation of the population is
   a. 419.43
   b. 20.48
   c. 75
   d. 750
35. Refer to Exhibit 7-2. The point estimate for the variance of the population is
   a. 419.43
   b. 20.48
   c. 75
   d. 750

36. Refer to Exhibit 7-2. The point estimate for the proportion of all students who passed the course is
   a. 0.8
   b. 0.2
   c. 1.8
   d. 1.2

37. When s is used to estimate σ, the margin of error is computed by using
   a. normal distribution
   b. t distribution
   c. the mean of the sample
   d. the mean of the population

38. In interval estimation, the t distribution is applicable only when
   a. the population has a mean of less than 30
   b. the sample standard deviation is used to estimate the population standard deviation
   c. the variance of the population is known
   d. the standard deviation of the population is known

39. The z value for a 97.8% confidence interval estimation is
   a. 2.02
   b. 1.96
   c. 2.00
   d. 2.29

40. The t value for a 95% confidence interval estimation with 24 degrees of freedom is
   a. 1.711
   b. 2.064
   c. 2.492
   d. 2.069

41. If we change a 95% confidence interval estimate to a 99% confidence interval estimate, we can expect
   a. the size of the confidence interval to increase
   b. the size of the confidence interval to decrease
   c. the size of the confidence interval to remain the same
   d. the sample size to increase

42. Whenever using the t distribution for interval estimation (when the sample size is very small), we must assume that
   a. the sample has a mean of at least 30
   b. the sampling distribution is not normal
   c. the population is approximately normal
   d. the finite population correction factor is necessary

43. When the level of confidence decreases, the margin of error
   a. stays the same
   b. becomes smaller
   c. becomes larger
   d. becomes smaller or larger, depending on the sample size
44. The following random sample from a population whose values were normally distributed was collected.

10  8  11  11

The 95% confidence interval for μ is
a. 8.52 to 10.98  
b. 7.75 to 12.25  
c. 9.75 to 10.75  
d. 8.00 to 10.00

Exhibit 8-6
A sample of 75 information system managers had an average hourly income of $40.75 with a standard deviation of $7.00.

45. Refer to Exhibit 8-6. If we want to determine a 95% confidence interval for the average hourly income, the value of “t” statistic is
a. 1.96  
b. 1.64  
c. 1.28  
d. 1.993

46. Refer to Exhibit 8-6. The standard error of the mean is
a. 80.83  
b. 7  
c. 0.8083  
d. 1.611

47. Refer to Exhibit 8-6. The value of the margin of error at 95% confidence is
a. 80.83  
b. 7  
c. 0.8083  
d. 1.611

48. Refer to Exhibit 8-6. The 95% confidence interval for the average hourly wage of all information system managers is
a. 40.75 to 42.36  
b. 39.14 to 40.75  
c. 39.14 to 42.36  
d. 30 to 50

49. In order to determine the summer unemployment rate among college students, a pilot sample was taken; and it was determined that ten percent of the individuals in the sample were unemployed. Using the results of the pilot study and a 95% confidence, what size sample would be required to estimate the proportion of unemployed college students if we want the margin of error not to exceed 3 percent?

a. 385  
b. 400  
c. 372  
d. 128