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Chapter 2: Frequency and Probability Distributions

Student: _____

1. A useful tool for summarizing a large set of data is a _____.

A. qualitative distribution

B. frequency distribution

C. descriptive distribution

D. all of these

2. A frequency distribution is a table that lists _____ on a variable and shows the number of individuals who obtained each _____.

A. scores; value

B. classes; frequencies

C. frequencies; class

D. scores; frequency

3. A table that lists scores on a variable and shows the number of occurrences of each score is called a ______ distribution.

A. probability

B. frequency

C. normal

D. density

4. If the scores of a class at midterm are 70, 70, 70, 80, 80, 90, 92, and 92, what is the relative frequency of the score 80?

A. 2

B. .25

C. .125

D. 5/8

5. A relative frequency is:

A. the proportion of times that a score occurred

B. the number of scores of a given value divided by the total number of scores

C. usually a more informative statistic than an absolute frequency

D. all of these

6. The relative frequencies in a distribution will always sum to:

A. 1.00

B. 100.00

- C. relative frequencies can not be summed
- D. none of these

7. When a relative frequency is multiplied by 100, it reflects the _____ of times the score occurred.

- A. proportion
- B. percentage
- C. absolute frequency
- D. cumulative frequency

8. The number of times that a score occurs divided by the total number of scores is termed a(n)_____.

- A. relative frequency
- B. cumulative frequency
- C. probability density
- D. average distribution

9. Given the scores 50, 50, 60, 70, 80, 90, 92, 92, what is the cumulative relative frequency for a score of 90? A. .125

- B. .83
- C. .25
- D. .75

10. For any given score, the cumulative frequency is the frequency associated with that score plus the sum of:

- A. all frequencies
- B. all frequencies above that score
- C. all frequencies below that score
- D. all frequencies except for that score

11. When we are concerned with a continuous variable, such as the degree of hyperactivity, frequencies and relative frequencies should be thought of in terms of the _____ of the scores.

- A. proportions
- B. percentages
- C. real limits
- D. proportions and percentages

12. Guidelines for grouping scores suggest you use _____ groups.
A. the fewest number of
B. between 0 and 5
C. between 5 and 15
D. over 20

13. If the lowest score in a distribution is 47 and the highest score is 99 and you used six groups, what is the appropriate interval size?

A. 5 B. 2

C. 10

D. 10.4

14. If the range of scores in a distribution were equal to 48 and you placed the scores within ten groups, what interval size should be used?

A. 4.8 B. 5.0

Б. 5.0 С. 10

D. 4.0

15. Suppose you were given 102 scores which ranged from 0 to 45 and you were asked to create a grouped frequency distribution using 15 intervals. What would be the most appropriate starting value?A. 0B. 15C. 3D. 7

16. As a rule of thumb, the use of _____ groups in a grouped frequency distribution tends to strike the appropriate balance between imprecision and incomprehensibility.
A. 5 to 15
B. 10
C. 10 to 20
D. 5 to 10

17. In grouped frequency distributions, we typically use interval sizes of _____.

A. 2 or 3

B. 5 or 10

C. 2, 3, or multiples of 5

D. none of these

18. In a grouped frequency distribution, the conventional starting point for the lowest interval is the closest number evenly divisible by the interval size that is equal to or less than the _____:

- A. highest score
- B. lowest score
- C. interval size
- D. real limits of the score

19. Refer to the following distribution



What is the relative frequency associated with a score of 9?

A. .15

B. .30

C. .45

D. 3

20. Refer to the following distribution

Х	f
10	2
9	3
8	3
7	5
6	2
5	3
4	0
3	2

What is the cumulative frequency associated with a score of 6?

A. 2

B. 5

C. 7

D. 13

21. A frequency distribution for qualitative variables would include all but which of the following?

A. frequencies

B. cumulative frequency

C. relative frequency

D. percentages

- 22. Cumulative relative frequencies are not appropriate for _____ variables.
- A. quantitative
- B. qualitative
- C. discrete

23. In frequency distributions for qualitative variables, the concepts of cumulative frequencies, cumulative relative frequencies, and cumulative percentages:

- A. are still applicable
- B. are mathematically different
- C. are functionally equivalent
- D. are not applicable

24. A(n) _____ is a case or a set of cases that shows a very extreme score relative to the majority of cases in the data set.

- A. outlier
- B. anomaly
- C. residual
- D. deviant case

25. In a frequency histogram, the horizontal dimension is called the _____, and the vertical dimension is called the _____. A. X axis; Y axis

- B. abscissa; ordinate
- C. ordinate; abscissa
- D. a and b

26. In a stem and leaf plot of IQ scores, the digits representing the number of "hundreds" and "tens" are the

- A. leaf
- B. base
- C. stem
- D. base and stem

27. The major difference between a frequency histogram and a bar graph is that, in a bar graph, the bars are drawn such that they:

- A. represent quantitative variables
- B. represent continuous variables
- C. do not touch one another
- D. do touch one another

28. Because frequency graphs can be misleading depending on how the abscissa and ordinate are formatted, behavioral scientists have adopted a _____.

- A. "two-thirds high" rule
- B. "ordinate only" rule
- C. "formatted ordinate" rule
- D. "one-third high" rule

29. In a cumulative frequency graph, the cumulative frequency curve will always _	or	_ as it moves
from left to right.		

- A. be variable; decrease
- B. remain level; increase
- C. increase; decrease
- D. remain level; decrease

30. The horizontal dimension of a frequency histogram is called a(n) _____.

- A. abscissa
- B. Y axis
- C. ordinate
- D. frequency line

31. The vertical dimension of a frequency histogram is called _____.

- A. an ordinate
- B. an X axis
- C. an abscissa
- D. none of these

32. Frequency graphs typically plot the frequency of a score along the _____.

- A. abscissa
- B. ordinate
- C. X axis
- D. all of these

33. A frequency polygon is typically used when the variable of interest is _____.

- A. discrete
- B. nominal
- C. qualitative
- D. continuous

34. If you want to graph a variable that is qualitative in nature, then you should use _____.

- A. a bar graph
- B. a histogram
- C. a frequency polygon
- D. It doesn't matter
- 35. Quantitative variables can be graphed using _____.
- A. frequency polygons
- B. bar graphs
- C. frequency histograms
- D. both frequency polygons and frequency histograms

36. A major difference between bar graphs and histograms is that _____.

- A. bar graphs exhibit only discrete data
- B. histograms use qualitative data

C. bar graphs separate the bars

D. histograms separate the bars

37. In frequency histograms, the frequencies associated with score values are labeled along the _____, and the score values are labeled along the _____.

- A. abscissa; ordinate
- B. bottom; side
- C. ordinate; abscissa
- D. horizontal axis; vertical axis

38. In a frequency polygon, the vertical bar denotes the _____, and the horizontal bar denotes the _____.

- A. frequencies; variable values
- B. variable values; frequencies

C. abscissa; ordinate

D. frequencies; ordinate

- 39. In a histogram, the horizontal bar denotes the _____, and the vertical bar denotes the _____.
- A. frequencies; ordinate
- B. variable values; frequencies
- C. abscissa; variable values
- D. frequencies; variable values
- 40. To produce a probability distribution of some variable, that variable must have the properties of being ______ and _____.
- A. continuous; inclusive
- B. mutually inclusive; discrete
- C. exhaustive; inclusive
- D. mutually exclusive; exhaustive
- 41. Probability distributions for continuous variables are conceptualized in terms of _____.
- A. exact probability calculations
- B. precise calculations
- C. mutually exclusive scores
- D. probability density functions
- 42. A probability density function _____.
- A. can be graphically represented as a bar graph
- B. can be used only to represent variables that are measured on a ratio curve
- C. is a smooth curve including all possible values of a continuous variable
- D. is always bell-shaped

43. Which of the following types of variables cannot be specified by listing possible values of the variable with corresponding probabilities?

- A. qualitative
- B. discrete
- C. continuous
- D. all of these

44. Given a distribution of scores, the probability of randomly selecting a given score from that distribution equals the _____ of that score.

A. cumulative frequency

- B. cumulative relative frequency
- C. frequency
- D. relative frequency

45. When the potential values for a qualitative or discrete variable are _____ and _____, then the probabilities associated with the individual score values will represent a probability distribution with respect to that variable. A. mutually exclusive; exhaustive

- B. mutually exclusive; nonexhaustive
- C. nominal; cumulative
- D. normally distributed; exhaustive

46. Statisticians conceptualize a probability distribution of a _____ in terms of a probability density function.

- A. qualitative variable
- B. discrete variable
- C. density slope
- D. continuous variable
- 47. The total area under the _____ represents _____.
- A. density area; 1.0
- B. density curve; 10.0
- C. density curve; 1.0
- D. density area; 100%

48. _____ are derived by making assumptions and representing those assumptions mathematically.

- A. Empirical distributions
- B. Theoretical distributions
- C. Assumptive distributions
- D. Realistic distributions

49. All distributions in the family of _____ distributions are symmetrical and characterized by a "bell shape." A. empirical

- B. theoretical
- C. actual
- D. normal
- 50. Which is not true of a normal distribution?
- A. It is bell-shaped.
- B. It is theoretical in nature.
- C. It is symmetrical.
- D. It is empirically derived.

51. Based on the Method of Presentation section of Chapter 2, the reason that a published manuscript does not typically report all types of frequency information is because

A. journal readers are expected to construct complete information from what is given

B. it is assumed that just relative frequencies or percentages provide the most concise information about any given research area

C. journal space is costly and it is not economically or practically feasible

D. researchers do not have enough time to provide complete information

52. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What is the cumulative frequency for a score of 5?

A. 17

B. 21

C. 4

D. 5

53. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What percentage of students were absent for 4 days?

A. 4.0 B. 20.0

D. 20.0

C. 52.0

D. 68.0

54. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What proportion of students were absent for 3 or less days?

A. .08

B. .40

C. .48

D. .60

55. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What is the cumulative relative frequency for 7 days absent?

A. 0

B. .87

C. .96

D. 24.0

56. In a grouped frequency distribution, the *interval size* refers to

A. the total number of values used in the frequency table

B. the lowest score in the frequency table

C. how many scores will be included in each group

D. the range of values that will characterize each group

57. A frequency distribution cannot be created for qualitative data, because these variables are not measured on any mathematical scale.

- A. true
- B. false

58. On a graph, the _____ refers to the Y-axis, while the _____ refers to the X-axis.

- A. ordinate, abscissa
- B. ordinal, abscissa
- C. abscissa, ordinate
- D. abscissa, ordinal
- 59. Which of the following graphs is "closed" with the abscissa?
- A. line plot
- B. frequency polygon
- C. histogram
- D. polygon

60. A stem and leaf plot is useful because it combines features of both a _____ and a(n) _____.

- A. grouped frequency distribution; ungrouped frequency distribution
- B. parameter; statistic
- C. line plot; pie chart
- D. frequency distribution; histogram

61. A graph can be misleading, depending how the abscissa and ordinate are formatted.

- A. true
- B. false

62. When the potential values for a qualitative or discrete variable are such that a person can have one and only one score, the score values are said to be

- A. mutually exclusive.
- B. exhaustive.
- C. infinite.
- D. exact.

63. _____distributions are based on actual measurements collected in the real world, while _____

distributions are constructed by making assumptions and representing these assumptions mathematically.

- A. Normal; empirical
- B. Empirical; theoretical
- C. Theoretical; empirical
- D. Normal; theoretical
- 64. An outlier is
- A. a case that shows a very extreme score relative to the majority of cases.
- B. a case that represents the score of the majority of cases.
- C. always caused by a clerical error in data collection.
- D. both a and \boldsymbol{c}
- E. both b and c $% \left({{{\mathbf{F}}_{{\mathbf{r}}}}_{{\mathbf{r}}}} \right)$
- 65. The concept of a probability density function is used with a
- A. qualitative variable.
- B. nominal variable.
- C. continuous variable.
- D. none of the above
- 66. Frequency distributions are used to _____
- A. summarize data that is quantitative in nature
- B. summarize data that is qualitative in nature
- C. summarize data that is normally distributed
- D. Both a & c

67. The x-axis is reserved for the _____variable and the y-axis is where the _____variable is found.

- A. independent; dependent
- B. dependent; independent
- C. quantitative; qualitative
- D. None of the above
- 68. The stem plot graph is used for_____.
- A. quantitative
- B. qualitative
- C. normally distributed data only
- D. none of the above

- 69. Relative frequency is the_____.
- A. Proportion of scores that occur in the distributions set divided by N
- B. The proportion of scores that occur at a particular score or lower than this score
- C. The proportion of all scores in the distribution
- D. None of these
- 70. Cumulative frequency is the_____.
- A. Proportion of scores that occur in the distributions set divided by N
- B. The proportion of scores that occur at a particular score or lower than this score
- C. The proportion of all scores in the distribution
- D. None of these

71. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	£
8	3
7	1
6	2
<u>5</u>	<u>2</u>

What is the relative frequency for being sick 8 days?

- A. .375
- **B**. 1.00
- C. .125
- D. None of these

72. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	£
8	3
7	1
6	2
<u>5</u>	2

What is the cumulative frequency for being sick 7 days?

- A. 8
- B. 5
- C. 1.00
- D. 3.00

73. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	£	
8	3	
7	1	
6	2	
<u>5</u>	<u>2</u>	

What is the cumulative relative frequency for being sick for 5 days?

- A. .375
- B. 1.00

C. .125

D. .250

E. None of these

74. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	<u>f</u>
8	3
7	1
6	2
<u>5</u>	<u>2</u>

What was the percentage of employee's that were sick for 7 days?

- A. 37.5%
- B. 12.50%
- C. 25.00%
- D. 90%
- 75. Bar graphs are used to present_____.
- A. quantitative variables
- B. qualitative variables
- C. normally distributed data
- D. Both a & b
- 76. Frequency histograms are used to present_____.
- A. quantitative variables
- B. qualitative variables
- C. normally distributed data
- D. Both a & b

77. Many frequency distributions use intervals to group data. For example, the in class exam scores ranged from 90-60 and the professor wants to have at least 6 groupings. What should be the interval?

- A. 6
- B. 5
- C. 7
- D. None of these

78. If measuring reaction times of subjects on a task, which is a continuous variable, on the x-axis should have_____.

- A. real limits of the number
- B. the number only
- C. probability mutualism
- D. Both a & c

79. The axis labeled "a" is called the_____.



- A. y-axis
- B. x-axis
- C. ordinate
- D. both b & c
- E. both a & c

80. The axis labeled "b" is called the_____.



A. y-axis

B. x-axis

C. ordinate

D. both b& c

E. both a & c

81. In a frequency histogram the frequency is usually labeled on the_____.



A. "a" the y-axis or abscissa B. "b" the x-axis or abscissa C. "b" the x-axis or ordinate D. "a' the y-axis or ordinate

82. If you were studying the effects of gender differences on reaction times. Gender or male or female should be labeled on the .



A. "a" the y-axis or abscissa

B. "b" the x-axis or abscissa

C. "b" the x-axis or ordinate

- D. "a' the y-axis or ordinate
- 83. Empirical distributions taken from a sample of the population may have_____.
- A. too many subjects
- B. outliers
- C. quantitative data only
- D. None of the above

84. Dr. Jones is studying recall for a list of 25 words. His numbers are as follows 10, 7, 8, 9, 10, 9, 8, 12 etc. How should he organize his data so it makes sense?

- A. Use a frequency distribution
- B. Draw a Frequency histogram
- C. examine the data for outliers
- D. All of these

85. Dr. Jones using the data above reported that 1 person out of his 100 subjects scored a perfect score of 25. This may be a _____. A. a subject with a good memory

B. outlier

- C. the celling effect
- D. Both a & b

86. The relative frequency indicates the _______scores appear in the data set.

87. The x-axis is called the_____.

88. The y-axis is called the_____.

•

89. If the relative frequency for the number of times students skip class per a semester is .10 then ______ percent miss class.

90. Cumulative frequency allows us to determine the number of scores ______a given score.

91. If the cumulative frequency for the score of 8 sick days is 10 the cumulative relative frequency for this score is ______ (note N=90).

92. A Interval size that would be appropriate for test scores ranging from high 90 to lowest 50 would be

93. A Bar graph is different then a frequency histogram since the ______.

94. The independent variable will be on the ______ of a graph.

95. A normal curve or distribution is ______nature.

96. A frequency distribution is a table that lists scores on a variable and shows the number of individuals who obtained each score. True False

97. There are numerous hard-and-fast rules for presenting frequency information. True False

98. Considered alone, an index of frequency is always meaningful. True False

99. A relative frequency is the number of scores of a given value divided by the total number of scores. True False

100. When a relative frequency is multiplied by 100, it reflects the proportion of times the score occurred. True False

101. For any given score, the cumulative frequency is the frequency associated with that score plus the sum of all frequencies below that score. True False

102. The advantage of cumulative frequencies is that they allow us to tell at a glance the number of scores that are equal to or greater than a given score value. True False

103. Cumulative percentages indicate the percentage of cases that have scores equal to or less than a given score value.

True False

104. Cumulative frequencies and cumulative relative frequencies are conceptualized with respect to the lower real limit of a score.True False

105. In constructing a frequency table, it would be neither practical nor informative to list 100 different values, each with a frequency of 1. True False

106. One should always report at least 10 groups in a grouped frequency distribution. True False

107. Typically, interval sizes of 2, 3, or multiples of 5 are used in grouped frequency distributions. True False

108. The conventional starting point for beginning the lowest interval in a grouped frequency distribution is 0. True False

109. The concepts of cumulative frequencies, cumulative relative frequencies, and cumulative percentages are not applicable to frequency distributions for qualitative variables. True False

110. An outlier is a case or set of cases that shows an average score relative to the majority of cases in the data set.

True False

111. Outliers are always due to clerical errors. True False

112. In a frequency histogram, the ordinate represents the frequency with which each score occurred. True False

113. If a variable is continuous, the vertical boundaries of the bar for a given score will represent the absolute frequency of that score.True False

114. A frequency polygon is similar to a frequency histogram and uses the same ordinate and abscissa. True False

115. Frequency polygons differ from frequency histograms in that bars are not used, but rather, solid dots corresponding to the appropriate frequencies are placed directly above the score values. True False

116. Frequency polygons are typically used only when the variables being reported are discrete in nature. True False

117. Frequency histograms are typically used only when the variables being reported are continuous in nature. True False

118. A line plot is a type of stem and leaf plot. True False

119. Frequency histograms and frequency polygons can be constructed for grouped as well as ungrouped scores.

True False

120. A stem and leaf plot is used to graph probability distributions. True False

121. Stem and leaf plots are useful as long as the number of scores is not too large and when the number of different values on the base are moderate in number. True False

122. Because frequency graphs can be misleading depending on how the abscissa and ordinate are formatted, behavioral scientists rarely use them.True False

123. In a cumulative frequency graph, the cumulative frequency curve will always remain level or increase as it moves from left to right.True False

124. A probability represents the proportion of times that some score was previously observed. True False

125. When the potential values for a qualitative or discrete variable are mutually exclusive and exhaustive, then the probabilities associated with the individual score values will represent a probability distribution with respect to that variable.

True False

126. Statisticians conceptualize a probability distribution of a discrete variable in terms of a probability density function.

True False

127. The total area under a density curve represents 1.00. True False

128. Empirical and theoretical distributions refer to actual measurements collected in the real world. True False

129. All distributions in the family of normal distributions are symmetrical and are characterized by a "bell shape." True False

130. We graph qualitative data the same way quantitative data is graphed. True False

131. Relative frequency indicates the probability of observing scores in the future. True False 132. Outliers can significantly change the frequency distribution. True False

133. Graphs can sometime be constructed to mislead the public. True False

134. Bar graphs are used to represent data that is quantitative in nature. True False

135. Frequency polygons are the same think as a bar graph. True False

136. The x-axis should contain the dependent variable. True False

137. When grouping data in a frequency distribution the interval size should always be 6. True False

138. Briefly describe what a frequency distribution is and how to construct one.

139. What is a relative frequency?

141. What three questions are central in deciding how to form the groups in a grouped frequency distribution?

142. How do we determine the number of groups to report in a grouped frequency distribution?

143. How do we determine the size of the interval to use in a grouped frequency distribution?

144. At what point do we begin the lowest interval in a grouped frequency distribution?

145. What is an outlier and why do they occur?

146. How does a frequency polygon differ from a frequency histogram?

147. What is the difference between a relative frequency and a probability?

148. Distinguish between empirical distributions and theoretical distributions.

149. What is the normal distribution?

150. Dr. Jones is studying the effects of caffeine on recall. She has collected data from 20 students. needs

X (score)	f
10	2
9	3
8	3
7	5
6	2
5	3
<u>3</u>	2
	N=20

a. Calculate the relative frequency, cumulative frequency and cumulative relative frequency for the distribution.

b. What is the **relative frequency** associated with a score of 9 on the recall test?

c. What is the **cumulative relative frequency** associated with a score of 6?

d. What is the **cumulative frequency** for the score of 3?

e. Now draw a frequency histogram of the data set above.

Chapter 2: Frequency and Probability Distributions Key

- 1. A useful tool for summarizing a large set of data is a _____.
- A. qualitative distribution

<u>B.</u> frequency distribution

- C. descriptive distribution
- D. all of these

2. A frequency distribution is a table that lists _____ on a variable and shows the number of individuals who obtained each _____.

- <u>A.</u> scores; value
- B. classes; frequencies
- C. frequencies; class
- D. scores; frequency

3. A table that lists scores on a variable and shows the number of occurrences of each score is called a ______ distribution.

- A. probability
- **<u>B.</u>** frequency
- C. normal
- D. density

4. If the scores of a class at midterm are 70, 70, 70, 80, 80, 90, 92, and 92, what is the relative frequency of the score 80?

- A. 2 <u>B.</u> .25 C. .125 D. 5/8
- 5. A relative frequency is:
- A. the proportion of times that a score occurred
- B. the number of scores of a given value divided by the total number of scores
- C. usually a more informative statistic than an absolute frequency
- **<u>D.</u>** all of these

6. The relative frequencies in a distribution will always sum to:

<u>A.</u> 1.00

B. 100.00

- C. relative frequencies can not be summed
- D. none of these

7. When a relative frequency is multiplied by 100, it reflects the _____ of times the score occurred.

- A. proportion
- **<u>B.</u>** percentage
- C. absolute frequency
- D. cumulative frequency

8. The number of times that a score occurs divided by the total number of scores is termed a(n)_____.

- <u>A.</u> relative frequency
- B. cumulative frequency
- C. probability density
- D. average distribution

9. Given the scores 50, 50, 60, 70, 80, 90, 92, 92, what is the cumulative relative frequency for a score of 90? A. .125

- B. .83
- C. .25
- <u>D.</u> .75

10. For any given score, the cumulative frequency is the frequency associated with that score plus the sum of: A. all frequencies

- B. all frequencies above that score
- <u>**C.**</u> all frequencies below that score
- D. all frequencies except for that score

11. When we are concerned with a continuous variable, such as the degree of hyperactivity, frequencies and relative frequencies should be thought of in terms of the _____ of the scores.

- A. proportions
- B. percentages
- <u>**C.**</u> real limits
- \overline{D} . proportions and percentages

12. Guidelines for grouping scores suggest you use _____ groups.
A. the fewest number of
B. between 0 and 5
C. between 5 and 15
D. over 20

13. If the lowest score in a distribution is 47 and the highest score is 99 and you used six groups, what is the appropriate interval size?

A. 5 B. 2

<u>C.</u> 10

D. 10.4

14. If the range of scores in a distribution were equal to 48 and you placed the scores within ten groups, what interval size should be used?

A. 4.8 <u>**B.**</u> 5.0 C. 10

D. 4.0

15. Suppose you were given 102 scores which ranged from 0 to 45 and you were asked to create a grouped frequency distribution using 15 intervals. What would be the most appropriate starting value?
<u>A.</u> 0
B. 15
C. 3

D. 7

16. As a rule of thumb, the use of _____ groups in a grouped frequency distribution tends to strike the appropriate balance between imprecision and incomprehensibility.
<u>A.</u> 5 to 15
B. 10
C. 10 to 20
D. 5 to 10

17. In grouped frequency distributions, we typically use interval sizes of _____.

A. 2 or 3

B. 5 or 10

<u>C.</u> 2, 3, or multiples of 5

D. none of these

18. In a grouped frequency distribution, the conventional starting point for the lowest interval is the closest number evenly divisible by the interval size that is equal to or less than the _____:

- A. highest score
- **<u>B.</u>** lowest score
- \overline{C} . interval size
- D. real limits of the score

19. Refer to the following distribution



What is the relative frequency associated with a score of 9?

<u>A.</u> .15

B. .30

C. .45

D. 3

20. Refer to the following distribution

Х	f
10	2
9	3
8	3
7	5
6	2
5	3
4	0
3	2

What is the cumulative frequency associated with a score of 6?

A. 2

B. 5

<u>C.</u>7

D. 13

21. A frequency distribution for qualitative variables would include all but which of the following?

A. frequencies

 $\underline{\mathbf{B.}}$ cumulative frequency

C. relative frequency

D. percentages

- 22. Cumulative relative frequencies are not appropriate for _____ variables.
- A. quantitative
- **<u>B.</u>** qualitative
- C. discrete

23. In frequency distributions for qualitative variables, the concepts of cumulative frequencies, cumulative relative frequencies, and cumulative percentages:

- A. are still applicable
- B. are mathematically different
- C. are functionally equivalent
- $\underline{\mathbf{D}}$. are not applicable

24. A(n) _____ is a case or a set of cases that shows a very extreme score relative to the majority of cases in the data set.

- <u>A.</u> outlier
- B. anomaly
- C. residual
- D. deviant case

25. In a frequency histogram, the horizontal dimension is called the _____, and the vertical dimension is called the _____.
A. X axis; Y axis

- B. abscissa; ordinate
- C. ordinate; abscissa
- <u>**D.**</u> a and b

26. In a stem and leaf plot of IQ scores, the digits representing the number of "hundreds" and "tens" are the

- A. leaf
- B. base
- $C. \ \text{stem}$
- $\underline{\mathbf{D}}$. base and stem

27. The major difference between a frequency histogram and a bar graph is that, in a bar graph, the bars are drawn such that they:

- A. represent quantitative variables
- B. represent continuous variables
- $\underline{\mathbf{C}}$. do not touch one another
- D. do touch one another

28. Because frequency graphs can be misleading depending on how the abscissa and ordinate are formatted, behavioral scientists have adopted a _____.

- <u>A.</u> "two-thirds high" rule
- B. "ordinate only" rule
- C. "formatted ordinate" rule
- D. "one-third high" rule

29. In a cumulative frequency graph, the cumulative frequency curve will always _	or	as it moves
from left to right.		

- A. be variable; decrease
- **<u>B.</u>** remain level; increase
- C. increase; decrease
- D. remain level; decrease

30. The horizontal dimension of a frequency histogram is called a(n) _____.

- A. abscissa
- B. Y axis
- C. ordinate
- D. frequency line

31. The vertical dimension of a frequency histogram is called _____.

- $\underline{\mathbf{A}}$. an ordinate
- B. an X axis
- C. an abscissa
- D. none of these

32. Frequency graphs typically plot the frequency of a score along the _____. A. abscissa

- $\underline{\mathbf{B}}_{\cdot}$ ordinate
- C. X axis
- D. all of these

33. A frequency polygon is typically used when the variable of interest is _____.

- A. discrete
- B. nominal

C. qualitative

 $\underline{\mathbf{D}}_{\boldsymbol{\cdot}}$ continuous

34. If you want to graph a variable that is qualitative in nature, then you should use _____.

- <u>A.</u> a bar graph
- B. a histogram
- C. a frequency polygon
- D. It doesn't matter
- 35. Quantitative variables can be graphed using _____.
- A. frequency polygons
- B. bar graphs
- C. frequency histograms
- **<u>D.</u>** both frequency polygons and frequency histograms

36. A major difference between bar graphs and histograms is that _____.

- A. bar graphs exhibit only discrete data
- B. histograms use qualitative data

<u>C.</u> bar graphs separate the bars

D. histograms separate the bars

37. In frequency histograms, the frequencies associated with score values are labeled along the _____, and the score values are labeled along the _____.

- A. abscissa; ordinate
- B. bottom; side

<u>C.</u> ordinate; abscissa

 \overline{D} . horizontal axis; vertical axis

38. In a frequency polygon, the vertical bar denotes the _____, and the horizontal bar denotes the _____.

- <u>A.</u> frequencies; variable values
- B. variable values; frequencies

C. abscissa; ordinate

D. frequencies; ordinate

- 39. In a histogram, the horizontal bar denotes the _____, and the vertical bar denotes the _____.
- A. frequencies; ordinate
- **<u>B.</u>** variable values; frequencies
- C. abscissa; variable values
- D. frequencies; variable values
- 40. To produce a probability distribution of some variable, that variable must have the properties of being _____ and _____.
- A. continuous; inclusive
- B. mutually inclusive; discrete
- C. exhaustive; inclusive
- **D.** mutually exclusive; exhaustive
- 41. Probability distributions for continuous variables are conceptualized in terms of _____.
- A. exact probability calculations
- B. precise calculations
- C. mutually exclusive scores
- **<u>D.</u>** probability density functions
- 42. A probability density function _____.
- A. can be graphically represented as a bar graph
- B. can be used only to represent variables that are measured on a ratio curve
- <u>C.</u> is a smooth curve including all possible values of a continuous variable
- \overline{D} . is always bell-shaped

43. Which of the following types of variables cannot be specified by listing possible values of the variable with corresponding probabilities?

- A. qualitative
- B. discrete
- <u>**C.</u>** continuous</u>
- \overline{D} . all of these

44. Given a distribution of scores, the probability of randomly selecting a given score from that distribution equals the _____ of that score.

- A. cumulative frequency
- B. cumulative relative frequency
- C. frequency
- <u>**D.**</u> relative frequency

45. When the potential values for a qualitative or discrete variable are _____ and _____, then the probabilities associated with the individual score values will represent a probability distribution with respect to that variable. **A.** mutually exclusive; exhaustive

- B. mutually exclusive; nonexhaustive
- C. nominal; cumulative
- D. normally distributed; exhaustive

46. Statisticians conceptualize a probability distribution of a _____ in terms of a probability density function.

- A. qualitative variable
- B. discrete variable
- C. density slope
- <u>**D.**</u> continuous variable
- 47. The total area under the _____ represents _____.
- A. density area; 1.0
- B. density curve; 10.0
- <u>**C.</u>** density curve; 1.0</u>
- D. density area; 100%

48. _____ are derived by making assumptions and representing those assumptions mathematically.

- A. Empirical distributions
- **<u>B.</u>** Theoretical distributions
- C. Assumptive distributions
- D. Realistic distributions

49. All distributions in the family of ______ distributions are symmetrical and characterized by a "bell shape."

- A. empirical
- B. theoretical
- C. actual
- <u>**D.**</u> normal
- 50. Which is not true of a normal distribution?
- A. It is bell-shaped.
- B. It is theoretical in nature.
- C. It is symmetrical.
- **<u>D.</u>** It is empirically derived.

51. Based on the Method of Presentation section of Chapter 2, the reason that a published manuscript does not typically report all types of frequency information is because

A. journal readers are expected to construct complete information from what is given

B. it is assumed that just relative frequencies or percentages provide the most concise information about any given research area

<u>C.</u> journal space is costly and it is not economically or practically feasible

D. researchers do not have enough time to provide complete information

52. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f	
8	1	
7	0	
6	3	
5	4	
4	5	
3	2	
2	6	
1	4	

What is the cumulative frequency for a score of 5?

A. 17 <u>B.</u> 21

C. 4

D. 5

53. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	<u>f</u>
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What percentage of students were absent for 4 days?

A. 4.0 <u>**B.**</u> 20.0

C. 52.0

D. 68.0

54. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What proportion of students were absent for 3 or less days?

A. .08

B. .40

<u>C.</u> .48

D. .60

55. Below is a frequency distribution of the number of days absent from school in a group of 25 fifth-grade students.

Score	f
8	1
7	0
6	3
5	4
4	5
3	2
2	6
1	4

What is the cumulative relative frequency for 7 days absent?

A. 0

B. .87

<u>C.</u> .96

D. 24.0

56. In a grouped frequency distribution, the *interval size* refers to

A. the total number of values used in the frequency table

B. the lowest score in the frequency table

- C. how many scores will be included in each group
- **<u>D.</u>** the range of values that will characterize each group

57. A frequency distribution cannot be created for qualitative data, because these variables are not measured on any mathematical scale.

A. true

<u>B.</u> false

58. On a graph, the _____ refers to the Y-axis, while the _____ refers to the X-axis.

- A. ordinate, abscissa
- B. ordinal, abscissa
- C. abscissa, ordinate
- D. abscissa, ordinal
- 59. Which of the following graphs is "closed" with the abscissa?
- A. line plot
- **<u>B.</u>** frequency polygon
- C. histogram
- D. polygon

60. A stem and leaf plot is useful because it combines features of both a _____ and a(n) _____.

- A. grouped frequency distribution; ungrouped frequency distribution
- B. parameter; statistic
- C. line plot; pie chart
- **<u>D.</u>** frequency distribution; histogram

61. A graph can be misleading, depending how the abscissa and ordinate are formatted.

- <u>A.</u> true
- B. false

62. When the potential values for a qualitative or discrete variable are such that a person can have one and only one score, the score values are said to be

- <u>**A.**</u> mutually exclusive.
- B. exhaustive.
- C. infinite.
- D. exact.

63. _____distributions are based on actual measurements collected in the real world, while _____

distributions are constructed by making assumptions and representing these assumptions mathematically.

- A. Normal; empirical
- **<u>B.</u>** Empirical; theoretical
- C. Theoretical; empirical
- D. Normal; theoretical
- 64. An outlier is

<u>A.</u> a case that shows a very extreme score relative to the majority of cases.

- B. a case that represents the score of the majority of cases.
- C. always caused by a clerical error in data collection.

 $\mathbb{D}.$ both a and c

- $E. \ both \ b \ and \ c$
- 65. The concept of a probability density function is used with a
- A. qualitative variable.

B. nominal variable.

<u>**C.</u>** continuous variable.</u>

- D. none of the above
- 66. Frequency distributions are used to _____
- <u>A.</u> summarize data that is quantitative in nature
- B. summarize data that is qualitative in nature
- C. summarize data that is normally distributed
- D. Both a & c

67. The x-axis is reserved for the _____variable and the y-axis is where the _____variable is found.

- <u>A.</u> independent; dependent
- B. dependent; independent
- C. quantitative; qualitative
- D. None of the above
- 68. The stem plot graph is used for_____.
- <u>**A.**</u> quantitative
- B. qualitative
- C. normally distributed data only
- D. none of the above

- 69. Relative frequency is the_____.
- A. Proportion of scores that occur in the distributions set divided by N
- B. The proportion of scores that occur at a particular score or lower than this score
- C. The proportion of all scores in the distribution
- D. None of these
- 70. Cumulative frequency is the_____.
- A. Proportion of scores that occur in the distributions set divided by N
- B. The proportion of scores that occur at a particular score or lower than this score
- C. The proportion of all scores in the distribution
- D. None of these

71. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	<u>f</u>
8	3
7	1
6	2
<u>5</u>	2

What is the relative frequency for being sick 8 days?

- <u>A.</u> .375
- B. 1.00
- C. .125
- D. None of these

72. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	£
8	3
7	1
6	2
<u>5</u>	2

What is the cumulative frequency for being sick 7 days?

- <u>A.</u> 8
- B. 5
- C. 1.00
- D. 3.00

73. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	£
8	3
7	1
6	2
<u>5</u>	2

What is the cumulative relative frequency for being sick for 5 days?

A. .375

B. 1.00

C. .125

D. .250

E. None of these

74. The Human resource department wants to determine the frequency of sick days for 8 employees' that make up their department. Below is their data

Days sick	f
8	3
7	1
6	2
<u>5</u>	2

What was the percentage of employee's that were sick for 7 days?

A. 37.5%

<u>**B.</u> 12.50%</u></u>**

C. 25.00%

D. 90%

75. Bar graphs are used to present_____.

A. quantitative variables

<u>B.</u> qualitative variables

- C. normally distributed data
- D. Both a & b

76. Frequency histograms are used to present_____.

<u>A.</u> quantitative variables

- B. qualitative variables
- C. normally distributed data
- D. Both a & b

77. Many frequency distributions use intervals to group data. For example, the in class exam scores ranged from 90-60 and the professor wants to have at least 6 groupings. What should be the interval?

- A. 6
- <u>**B.**</u>5
- C. 7

D. None of these

78. If measuring reaction times of subjects on a task, which is a continuous variable, on the x-axis should have_____.

- <u>A.</u> real limits of the number
- B. the number only
- C. probability mutualism
- D. Both a & c

79. The axis labeled "a" is called the_____.



- A. y-axis
- B. x-axis
- C. ordinate
- D. both b & c
- <u>**E.</u>** both a & c</u>

80. The axis labeled "b" is called the_____.



A. y-axis <u>**B.**</u> x-axis

 \overline{C} . ordinate

D. both b& c

E. both a & c

81. In a frequency histogram the frequency is usually labeled on the_____.



A. "a" the y-axis or abscissa B. "b" the x-axis or abscissa C. "b" the x-axis or ordinate <u>D.</u> "a" the y-axis or ordinate 82. If you were studying the effects of gender differences on reaction times. Gender or male or female should be labeled on the_____.



A. "a" the y-axis or abscissa

<u>B.</u> "b" the x-axis or abscissa

 \overline{C} . "b" the x-axis or ordinate

D. "a' the y-axis or ordinate

83. Empirical distributions taken from a sample of the population may have_____.

- A. too many subjects
- **<u>B.</u>** outliers

 \overline{C} . quantitative data only

D. None of the above

84. Dr. Jones is studying recall for a list of 25 words. His numbers are as follows 10, 7, 8, 9, 10, 9, 8, 12 etc. How should he organize his data so it makes sense?

A. Use a frequency distribution

- B. Draw a Frequency histogram
- C. examine the data for outliers
- $\underline{\mathbf{D}}$. All of these

85. Dr. Jones using the data above reported that 1 person out of his 100 subjects scored a perfect score of 25. This may be a _____.

A. a subject with a good memory

B. outlier

- C. the celling effect
- <u>**D.**</u> Both a & b

86. The relative frequency indicates the ______scores appear in the data set. **Proportion of times**

87. The x-axis is called the_____. Abscissa

88. The y-axis is called the	
<u>Ordinate</u>	

89. If the relative frequency for the number of times students skip class per a semester is .10 then ______ percent miss class.

<u>10</u>

90. Cumulative frequency allows us to determine the number of scores ______a given score. at or above

91. If the cumulative frequency for the score of 8 sick days is 10 the cumulative relative frequency for this score is ______ (note N=90).
<u>11</u> or ______

92. A Interval size that would be appropriate for test scores ranging from high 90 to lowest 50 would be

<u>4</u> or <u>four</u>

93. A Bar graph is different then a frequency histogram since the ______. **bars do not touch**

94. The independent variable will be on the ______ of a graph. <u>x-axis</u> or <u>Abscissa</u>

95. A normal curve or distribution is _______nature. theoretical

96. A frequency distribution is a table that lists scores on a variable and shows the number of individuals who obtained each score.

<u>TRUE</u>

97. There are numerous hard-and-fast rules for presenting frequency information. **FALSE**

98. Considered alone, an index of frequency is always meaningful. **FALSE**

99. A relative frequency is the number of scores of a given value divided by the total number of scores. **TRUE**

100. When a relative frequency is multiplied by 100, it reflects the proportion of times the score occurred. **FALSE**

101. For any given score, the cumulative frequency is the frequency associated with that score plus the sum of all frequencies below that score.

TRUE

102. The advantage of cumulative frequencies is that they allow us to tell at a glance the number of scores that are equal to or greater than a given score value. **FALSE**

103. Cumulative percentages indicate the percentage of cases that have scores equal to or less than a given score value.

TRUE

104. Cumulative frequencies and cumulative relative frequencies are conceptualized with respect to the lower real limit of a score. **FALSE**

105. In constructing a frequency table, it would be neither practical nor informative to list 100 different values, each with a frequency of 1. **TRUE**

106. One should always report at least 10 groups in a grouped frequency distribution. **FALSE**

107. Typically, interval sizes of 2, 3, or multiples of 5 are used in grouped frequency distributions. **TRUE**

108. The conventional starting point for beginning the lowest interval in a grouped frequency distribution is 0. **FALSE**

109. The concepts of cumulative frequencies, cumulative relative frequencies, and cumulative percentages are not applicable to frequency distributions for qualitative variables. <u>TRUE</u>

110. An outlier is a case or set of cases that shows an average score relative to the majority of cases in the data set.

FALSE

111. Outliers are always due to clerical errors. \underline{FALSE}

112. In a frequency histogram, the ordinate represents the frequency with which each score occurred. **TRUE**

113. If a variable is continuous, the vertical boundaries of the bar for a given score will represent the absolute frequency of that score. **FALSE**

114. A frequency polygon is similar to a frequency histogram and uses the same ordinate and abscissa. **TRUE**

115. Frequency polygons differ from frequency histograms in that bars are not used, but rather, solid dots corresponding to the appropriate frequencies are placed directly above the score values. **TRUE**

116. Frequency polygons are typically used only when the variables being reported are discrete in nature. **FALSE**

117. Frequency histograms are typically used only when the variables being reported are continuous in nature. **FALSE**

118. A line plot is a type of stem and leaf plot. **TRUE**

119. Frequency histograms and frequency polygons can be constructed for grouped as well as ungrouped scores.

<u>TRUE</u>

120. A stem and leaf plot is used to graph probability distributions. $\underline{\textbf{FALSE}}$

121. Stem and leaf plots are useful as long as the number of scores is not too large and when the number of different values on the base are moderate in number. **TRUE**

122. Because frequency graphs can be misleading depending on how the abscissa and ordinate are formatted, behavioral scientists rarely use them. **FALSE**

123. In a cumulative frequency graph, the cumulative frequency curve will always remain level or increase as it moves from left to right. **TRUE**

124. A probability represents the proportion of times that some score was previously observed. **FALSE**

125. When the potential values for a qualitative or discrete variable are mutually exclusive and exhaustive, then the probabilities associated with the individual score values will represent a probability distribution with respect to that variable.

TRUE

126. Statisticians conceptualize a probability distribution of a discrete variable in terms of a probability density function.

FALSE

127. The total area under a density curve represents 1.00. **TRUE**

128. Empirical and theoretical distributions refer to actual measurements collected in the real world. **FALSE**

129. All distributions in the family of normal distributions are symmetrical and are characterized by a "bell shape."

<u>TRUE</u>

130. We graph qualitative data the same way quantitative data is graphed. **FALSE**

131. Relative frequency indicates the probability of observing scores in the future. **FALSE**

132. Outliers can significantly change the frequency distribution. $\underline{\mathbf{TRUE}}$

133. Graphs can sometime be constructed to mislead the public. **TRUE**

134. Bar graphs are used to represent data that is quantitative in nature. **TRUE** \Box

135. Frequency polygons are the same think as a bar graph. **FALSE**

136. The x-axis should contain the dependent variable. \underline{FALSE}

137. When grouping data in a frequency distribution the interval size should always be 6. **FALSE**

138. Briefly describe what a frequency distribution is and how to construct one.

A frequency distribution is a table that lists scores on a variable and shows the number of individuals who obtained each value. We list the score values from highest to lowest. We then derive absolute frequencies by counting the number of individuals who received each score and indicate these frequencies next to the corresponding score values.

139. What is a relative frequency?

A relative frequency is the number of scores of a given value divided by the total number of scores--that is, the proportion of times that a score occurred.

140. What is a cumulative frequency?

Cumulative frequencies are obtained by a process of successive addition of the entries in the frequency column. For any given score, the cumulative frequency is the frequency associated with that score plus the sum of all frequencies below that score. The advantage of cumulative frequencies is that they allow us to tell at a glance the number of scores that are equal to or less than a given score value.

141. What three questions are central in deciding how to form the groups in a grouped frequency distribution?

The three questions we must consider are: (1) How many groups should be reported? (2) What should the interval size be for each group? and (3) What should be the lowest value at which the first interval starts?

142. How do we determine the number of groups to report in a grouped frequency distribution?

In deciding how many groups to report, a balance must be struck between having so many groups that the data are incomprehensible and having so few groups that the table is imprecise. In general, if the number of possible score values is small, fewer groups can be used, whereas if the number of possible score values is large, more groups will be required. As a rule of thumb, the use of 5 to 15 groups tends to strike the appropriate balance between imprecision and incomprehensibility in most instances.

143. How do we determine the size of the interval to use in a grouped frequency distribution?

Typically, interval sizes of 2, 3, or multiples of 5 are used. To determine the interval size for a particular set of data, first subtract the lowest score from the highest score. This difference should then be divided by the desired number of groups and the result rounded to the nearest of the commonly used interval-size values.

144. At what point do we begin the lowest interval in a grouped frequency distribution?

The conventional starting point for the lowest interval in a grouped frequency distribution is the closest number evenly divisible by the interval size that is equal to or less than the lowest score.

145. What is an outlier and why do they occur?

An outlier is a case or set of cases that shows a very extreme score relative to the majority of cases in the data set--so extreme that the score is suspect. An outlier may be the result of a clerical error, as would be the case when a score is copied incorrectly from a questionnaire response. Alternatively, it may be that the person providing the response is somehow unique relative to the other people in the study.

146. How does a frequency polygon differ from a frequency histogram?

A frequency polygon is similar to a frequency histogram and uses the same ordinate and abscissa. The major difference from the frequency histogram is that bars are not used, but rather, solid dots corresponding to the appropriate frequencies are placed directly above the score values. The dots are then connected by solid lines. Frequency polygons are always "closed" on the abscissa in the sense that they always include a value that is a unit higher than the highest observed score and a unit lower than the lowest observed score, with a zero frequency denoted for each.

147. What is the difference between a relative frequency and a probability?

Whereas a relative frequency indicates the proportion of times that some score was previously observed, a probability represents the likelihood of observing that score in the future.

148. Distinguish between empirical distributions and theoretical distributions.

Empirical distributions are based on actual measurements collected in the real world. Theoretical distributions are not constructed by formally taking measurements but, rather, are derived by making assumptions and representing these assumptions mathematically.

149. What is the normal distribution?

The normal distribution is one very important type of theoretical distribution that has been studied extensively by statisticians. There is actually a family of normal distributions, each member of which is precisely defined by a mathematical formula. All distributions in this family are symmetrical and are characterized by a "bell shape."

150. Dr. Jones is studying the effects of caffeine on recall. She has collected data from 20 students. needs

X (score)	f
10	2
9	3
8	3
7	5
6	2
5	3
<u>3</u>	<u>2</u>
	N=20

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a. Calculate the relative frequency, cumulative frequency and cumulative relative frequency for the distribution.

- b. What is the **relative frequency** associated with a score of 9 on the recall test?
- c. What is the **cumulative relative frequency** associated with a score of 6?
- d. What is the **cumulative frequency** for the score of 3?

e. Now draw a frequency histogram of the data set above.

a.

X (score)	f	rf	cf	crf	
10	2	.10	20	1	
9	3	.15	18	.90	
8	3	.15	15	.75	
7	5	.25	12	.60	
6	2	.10	7	.35	
5	3	.15	5	.25	
3	2	.10	2	.10	
	N=20				

b. .15 or 15 %

c. .25

d. 2