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

Determine whether the given value is a statistic or a parameter.

1) After inspecting all of 55,000 kg of meat stored at the Wurst Sausage Company, it was found that 45,000 kg of the meat was spoiled.
   A) Statistic               B) Parameter

Identify the number as either continuous or discrete.

2) The number of stories in a Manhattan building is 22.
   A) Discrete                B) Continuous

Determine which of the four levels of measurement (nominal, ordinal, interval, ratio) is most appropriate.

3) Amount of fat (in grams) in cookies.
   A) Interval               B) Ratio                C) Nominal               D) Ordinal

4) Temperatures of the ocean at various depths.
   A) Ordinal               B) Interval            C) Nominal               D) Ratio

Perform the requested conversions. Round decimals to the nearest thousandth and percents to the nearest tenth of a percent, if necessary.

5) Convert 87.5% to an equivalent fraction and decimal.
   A) \( \frac{3}{4} \), 8.75        B) \( \frac{3}{4} \), 0.875      C) \( \frac{7}{8} \), 0.875    D) \( \frac{7}{8} \), 8.75

Solve the problem.

6) Alex and Juana went on a 50-mile canoe trip with their class. On the first day they traveled 29 miles. What percent of the total distance did they canoe?
   A) 0.58%                B) 200%                 C) 58%                  D) 2%

Is the study experimental or observational?

7) A quality control specialist compares the output from a machine with a new lubricant to the output of machines with the old lubricant.
   A) Experimental          B) Observational

Identify the type of observational study.

8) A town obtains current employment data by polling 10,000 of its citizens this month.
   A) Prospective           B) Retrospective     C) Cross-sectional  D) None of these
Identify which of these types of sampling is used: random, stratified, systematic, cluster, convenience.

9) A market researcher selects 500 people from each of 10 cities.
   (A) Cluster
   B) Random
   C) Stratified
   D) Systematic
   E) Convenience

Construct the relative frequency distribution that corresponds to the given frequency distribution.

10) 

<table>
<thead>
<tr>
<th>Scores</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>5</td>
</tr>
<tr>
<td>81-90</td>
<td>5</td>
</tr>
<tr>
<td>71-80</td>
<td>7</td>
</tr>
<tr>
<td>61-70</td>
<td>8</td>
</tr>
<tr>
<td>&lt;61</td>
<td>4</td>
</tr>
</tbody>
</table>

A) Relative Frequency |

<table>
<thead>
<tr>
<th>Scores</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>5</td>
<td>15.5%</td>
</tr>
<tr>
<td>81-90</td>
<td>5</td>
<td>22.1%</td>
</tr>
<tr>
<td>71-80</td>
<td>7</td>
<td>31.3%</td>
</tr>
<tr>
<td>61-70</td>
<td>8</td>
<td>16.2%</td>
</tr>
<tr>
<td>&lt;61</td>
<td>4</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

B) Relative Frequency |

<table>
<thead>
<tr>
<th>Scores</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
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<td>17.24%</td>
</tr>
<tr>
<td>81-90</td>
<td>5</td>
<td>17.24%</td>
</tr>
<tr>
<td>71-80</td>
<td>7</td>
<td>24.14%</td>
</tr>
<tr>
<td>61-70</td>
<td>8</td>
<td>27.59%</td>
</tr>
<tr>
<td>&lt;61</td>
<td>4</td>
<td>13.79%</td>
</tr>
</tbody>
</table>

C) Relative Frequency |

<table>
<thead>
<tr>
<th>Scores</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>5</td>
<td>0.28%</td>
</tr>
<tr>
<td>81-90</td>
<td>5</td>
<td>0.07%</td>
</tr>
<tr>
<td>71-80</td>
<td>7</td>
<td>0.41%</td>
</tr>
<tr>
<td>61-70</td>
<td>8</td>
<td>0.17%</td>
</tr>
<tr>
<td>&lt;61</td>
<td>4</td>
<td>0.07%</td>
</tr>
</tbody>
</table>

D) Relative Frequency |

<table>
<thead>
<tr>
<th>Scores</th>
<th>Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91-100</td>
<td>5</td>
<td>12.5%</td>
</tr>
<tr>
<td>81-90</td>
<td>5</td>
<td>20.1%</td>
</tr>
<tr>
<td>71-80</td>
<td>7</td>
<td>37.3%</td>
</tr>
<tr>
<td>61-70</td>
<td>8</td>
<td>15.2%</td>
</tr>
<tr>
<td>&lt;61</td>
<td>4</td>
<td>14.9%</td>
</tr>
</tbody>
</table>
Construct the At Most cumulative frequency distribution that corresponds to the given frequency distribution.

<table>
<thead>
<tr>
<th>Weight (oz)</th>
<th>Number of Stones</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 - 1.6</td>
<td>5</td>
</tr>
<tr>
<td>1.7 - 2.1</td>
<td>2</td>
</tr>
<tr>
<td>2.2 - 2.6</td>
<td>5</td>
</tr>
<tr>
<td>2.7 - 3.1</td>
<td>5</td>
</tr>
<tr>
<td>3.2 - 3.6</td>
<td>13</td>
</tr>
</tbody>
</table>

\[
\begin{array}{|c|c|}
\hline
\text{AT MOST CUMULATIVE FREQ} & \text{AT MOST CUMULATIVE FREQ} \\
\hline
5 & 7 \\
12 & 17 \\
30 & \text{B)} \\
\hline
\end{array}
\]

A) 3

Provide an appropriate response.

12) Sturges' guideline suggests that when constructing a frequency distribution, the ideal number of classes can be approximated by \(1 + \log n / \log 2\), where \(n\) is the number of data values. Use this guideline to find the ideal number of classes when the number of data values is 122.

\[
\text{Class Width} = 1 + \frac{\log 122}{\log 2} = 7.93 \approx 8
\]

A) 8

B) 10

C) 7

D) 9

12) A
A nurse measured the blood pressure of each person who visited her clinic. Following is a relative-frequency histogram for the systolic blood pressure readings for those people aged between 25 and 40. Use the histogram to answer the question. The blood pressure readings were given to the nearest whole number.

13) What common class width was used to construct the frequency distribution?
   A) 11  B) 100  C) 9  D) 10

Find the median for the given sample data.

14) The distances traveled (in miles) to 7 different swim meets are given below:
   15, 30, 30, 44, 60, 70, 79
   Find the median distance traveled.
   A) 60 miles  B) 44 miles  C) 30 miles  D) 47 miles

Find the mode(s) for the given sample data.

15) 20, 21, 46, 21, 49, 21, 49
   A) 21  B) 32.4  C) 49  D) 46

Find the mean of the data summarized in the given frequency distribution.

16) The highway speeds of 100 cars are summarized in the frequency distribution below. Find the mean speed.

<table>
<thead>
<tr>
<th>Speed (mph)</th>
<th>Cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>3</td>
</tr>
<tr>
<td>40-49</td>
<td>17</td>
</tr>
<tr>
<td>50-59</td>
<td>51</td>
</tr>
<tr>
<td>60-69</td>
<td>16</td>
</tr>
<tr>
<td>70-79</td>
<td>13</td>
</tr>
</tbody>
</table>

A) 54.5 mph  B) 59.2 mph  C) 62.0 mph  D) 56.4 mph
Solve the problem.

17) Elaine gets quiz grades of 60, 69, and 68. She gets a 65 on her final exam. Find the weighted mean if the quizzes each count for 10% and the final exam counts for 70% of the final grade.

A) 62.2          B) 65.3          C) 65.2          D) 65.5

\[
\text{Weighted Mean} = 0.1 \times 60 + 0.1 \times 69 + 0.1 \times 68 + 0.7 \times 65 = 65.12
\]

Find the standard deviation of the data summarized in the given frequency distribution.

18) A company had 80 employees whose salaries are summarized in the frequency distribution below. Find the standard deviation.

<table>
<thead>
<tr>
<th>Salary</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,001 - 10,000</td>
<td>11</td>
</tr>
<tr>
<td>10,001 - 15,000</td>
<td>15</td>
</tr>
<tr>
<td>15,001 - 20,000</td>
<td>19</td>
</tr>
<tr>
<td>20,001 - 25,000</td>
<td>10</td>
</tr>
<tr>
<td>25,001 - 30,000</td>
<td>25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Midpoint</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,500</td>
<td>11</td>
</tr>
<tr>
<td>12,500</td>
<td>15</td>
</tr>
<tr>
<td>17,500</td>
<td>19</td>
</tr>
<tr>
<td>22,500</td>
<td>10</td>
</tr>
<tr>
<td>27,500</td>
<td>25</td>
</tr>
</tbody>
</table>

A) s = 7527.0  B) s = 7168.6  C) s = 7957.1  D) s = 7742.1

Solve the problem.

19) The heights of the adults in one town have a mean of 67.5 inches and a standard deviation of 3.4 inches. What can you conclude from Chebyshev's theorem about the percentage of adults in the town whose heights are between 60.7 and 74.3 inches?

A) The percentage is at most 75%  B) The percentage is at least 75%
C) The percentage is at most 95%  D) The percentage is at least 95%

\[
\begin{align*}
\bar{x} &= 67.5 \\
\sigma &= 3.4 \\
\frac{1}{3} \sigma &= 1.133 \\
Z_1 &= \frac{60.7 - 67.5}{3.4} = -2.073 \\
Z_2 &= \frac{74.3 - 67.5}{3.4} = 2.059 \\
1 - \frac{1}{Z^2} &= 1 - \frac{1}{2.073^2} = 1 - 0.25 = 0.75 = 75% \\
\end{align*}
\]

Find the z-score corresponding to the given value and use the z-score to determine whether the value is unusual. Consider a score to be unusual if its z-score is less than -2.00 or greater than 2.00. Round the z-score to the nearest tenth if necessary.

20) A time for the 100 meter sprint of 20.0 seconds at a school where the mean time for the 100 meter sprint is 17.7 seconds and the standard deviation is 2.1 seconds.

A) 2.3; unusual  B) 1.1; not unusual
C) -1.1; not unusual  D) 1.1; unusual

\[
\begin{align*}
\bar{x} &= 17.7 \\
\sigma &= 2.1 \\
Z &= \frac{20 - 17.7}{2.1} = 1.095 \\
\end{align*}
\]
Find the indicated measure.

21) The weights (in pounds) of 30 newborn babies are listed below. Find \( P_{16} \) (the 16th percentile).

5.5 5.7 5.8 5.9 6.1 6.1 6.4 6.4 6.5 6.6
6.7 6.7 6.9 7.0 7.0 7.0 7.1 7.2 7.2
7.4 7.5 7.7 7.7 7.8 8.0 8.1 8.1 8.3 8.7 Remember to sort the data first in an ascending order.

\[
L = 0.16 \times 30 = 4.8
\]

\[P_{16} = P_{0.16 \times 30} = 6.1\]

A) 5.9   B) 4.8   C) 6.0   D) 6.1

22) The normal monthly precipitation (in inches) for August is listed for 20 different U.S. cities. Construct a boxplot for the data set.

0.4 1.0 1.5 1.6 2.0
2.2 2.4 2.7 3.4 3.4
3.5 3.6 3.6 3.7 3.7
3.9 4.1 4.2 4.2 7.0

A)  

\[
\begin{array}{c}
\text{2.85} \\
0.4 \quad 2.1 \quad 3.8 \quad 7.0 \\
\end{array}
\]

B)  

\[
\begin{array}{c}
\text{2.9} \\
0.4 \quad 2.0 \quad 3.7 \quad 7.0 \\
\end{array}
\]

C)  

\[
\begin{array}{c}
\text{3.45} \\
0.4 \quad 2.1 \quad 3.8 \quad 7.0 \\
\end{array}
\]

D)  

\[
\begin{array}{c}
\text{3.4} \\
0.4 \quad 2.0 \quad 3.7 \quad 7.0 \\
\end{array}
\]

C