Statistics and Probability Quiz Answer Key

Daily High Temperatures in New York City

<table>
<thead>
<tr>
<th>Day</th>
<th>High Temperature (Degrees F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>63</td>
</tr>
<tr>
<td>Monday</td>
<td>55</td>
</tr>
<tr>
<td>Tuesday</td>
<td>59</td>
</tr>
<tr>
<td>Wednesday</td>
<td>56</td>
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<tr>
<td>Thursday</td>
<td>57</td>
</tr>
<tr>
<td>Friday</td>
<td>60</td>
</tr>
<tr>
<td>Saturday</td>
<td>88</td>
</tr>
</tbody>
</table>

The table shows the daily high temperatures for a week in April in New York City. What is the RANGE of the temperatures?

A) 32°F  
B) 33°F  
C) 59°F  
D) 62.6°F

Explanation:
In the table, 88 is an outlier. This causes a larger range in the data set. The range of daily high temperatures is 33°F.  
88°F – 55°F = 33°F.

2) What is the line of best fit for this data?

(1, 5)(2, 8)(3, 11)(4, 14)(5, 17)(6, 20)(7, 23)

A) y = 3x - 2  
B) y = 3x + 2  
C) y = -3x + 2  
D) y = \frac{1}{3}x - \frac{2}{3}

Explanation:
Enter the points onto a graphing calculator. If you are using a TI-83 use the STAT button to edit the data into a table and the STAT-CALC option to find the LinReg(ax+b). The equation \( y = 3x + 2 \) is the line of best fit for this data.
3) Pairs of Shoes in Closets

<table>
<thead>
<tr>
<th></th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>10</td>
<td></td>
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<tr>
<td>8</td>
<td>15</td>
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<td>6</td>
<td>7</td>
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<td>14</td>
<td>8</td>
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<td>18</td>
<td>12</td>
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<td>11</td>
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<td>9</td>
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<td>13</td>
<td>5</td>
<td></td>
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<tr>
<td>15</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Jeffrey surveys the 13 girls and 13 boys in his class to find out how many pairs of shoes they have in their closets. Which statement is true?

A) The value of Q3 for the boys is greater than the value of Q3 for the girls.
B) The mean number of shoes for the boys is greater than the mean number of shoes for the girls.
C) The mean number of shoes for the boys is less than the mean number of shoes for the girls.
D) The median number of shoes for the boys is greater than the median number of shoes for the girls.

Explanation:
The mean number of shoes for the boys is less than the mean number of shoes for the girls. To find the means, take the average of each data set.

4) Male | Female

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>History</th>
<th>Math</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Female</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

Owen surveyed his class on their favorite subject and kept track of the results based on the person's gender as well. The results are shown in the table. What is the relative frequency of someone liking math?

A) 0.113
B) 0.189
C) 0.302
D) 0.547

Explanation:
To find the relative frequency of a person liking math divide the number of people who like math by the total number of people surveyed that day.
\[
\frac{16}{53} = 0.302
\]
5) Mr Thompson's math class averaged poorly on a test, so he gave them a retest. There are 30 students in his class. On the retest, 10 students gained 10 points each, 10 students lost 10 points each, and 10 students had no change in their scores. How does the MEAN of the retest scores compare to the MEAN of the scores on the first test?

A) The means are the same.
B) The mean on the retest is 3 points higher.
C) The mean on the retest is 10 points higher.
D) The mean on the retest is 13 points higher.

**Explanation:**
The means are the same. The total of all the scores doesn't change, because the ups and the downs cancel each other out.

6) When Danielle goes grocery shopping, she usually buys a gallon of milk and some dinner rolls. She has noticed that there seems to be a correlation between the price of milk and dinner rolls. In other words, when the price of milk goes up, the price of dinner rolls goes up, and when the price of milk goes down, the price of dinner rolls goes down.

Which fact would lead you to believe that the relationship between the prices is not only a correlation, but also one of causation?

A) Whenever milk is on sale, dinner rolls are also on sale.
B) Milk and dinner rolls are often served during the same meal.
C) Milk is one of the major ingredients used to make dinner rolls.
D) The prices of milk and dinner rolls both move with the rate of inflation.

**Explanation:**
Even though the prices of milk and dinner rolls both move with the rate of inflation, it does not mean that an increase or a decrease in the price of milk causes an increase or a decrease in the price of dinner rolls. However, if milk is used to make dinner rolls, an increase in its price would cause the cost of making dinner rolls to increase, and this, in turn, would likely cause the price of dinner rolls to rise. Therefore, one would believe that the relationship between the prices is not only a correlation, but also a causation if milk is one of the major ingredients used to make dinner rolls.

7) Suppose you are investigating which hamburger condiment is most popular in a school cafeteria. Which type of display would be MOST useful for communicating your results?

A) boxplot
B) histogram
C) bar graph
D) scatter plot

**Explanation:**
A bar graph is the only option which is appropriate for qualitative (or categorical) data.
8)

Temperature

| Temperature (°F) | 50 | 42 | 31 | 62 | 51 | 55 | 45 |

Which boxplot correctly displays the data in the set?

A)  

B)  

C)  

D)  

Explanation:  
B is correct. Be sure the min, max, and median match.
9) Which situation matches the graph?
   A) A ball was dropped off a cliff and fell for a while until it hit the ground at \( t = 7 \).
   B) A ball was kicked from the ground which rose for a while and then fell back and hit the ground at \( t = 7 \).
   C) A dog picked a ball up off the ground and ran with it to his dog house and then dropped it there at \( t = 7 \).
   D) A person threw a ball up into the air which rose for a while and then fell back and hit the ground at \( t = 7 \).

Explanation:
The correct answer is **A person threw a ball up into the air which rose for a while and then fell back and hit the ground at \( t = 7 \)**. Since the ball did not start at 0 it could not have started at ground level. Also the height of the ball increased first meaning that it must have gone up into the air to begin with and could not have started out falling.

10) For the given data set if another data point was added, which one would lower the mean the most?
   A) 98
   B) 122
   C) 250
   D) 368

Explanation:
98 would lower the mean the most. It is the lowest number and since the mean is strongly affected by outliers it would impact the mean the most.