assignment #3

1. The Environmental Protection Agency records data on the fuel economy of many different makes of cars. They are interested in determining if one could predict the mileage of the car (in miles per gallon) from the weight of the car (in lbs).

   True or False

   The variable weight of the car (in lbs) is the response variable in this study.

   ○ A. True
   ○ B. False

   Answer: B

2. A college newspaper interviews a psychologist about a proposed system for rating the teaching ability of faculty members. The psychologist says, “The evidence indicates that the correlation between a faculty member's research productivity and teaching rating is close to zero.” What would be a correct interpretation of this statement?

   ○ A. Good researchers tend to be poor teachers and vice versa.
   ○ B. Good teachers tend to be poor researchers and vice versa.
   ○ C. Good research and good teaching go hand in hand.
   ○ D. Good researchers are just as likely to be good teachers as they are bad teachers. Likewise for poor researchers.

   Answer: D

3. The British government conducts regular surveys of household spending. The average weekly household spending on tobacco products and spending on alcoholic beverages for each of 11 regions in Great Britain were recorded. A scatterplot of spending on tobacco versus spending on alcohol is given below:

   ![Scatterplot](image)

   Reference: Ref 2-4

   What is the most plausible value for the correlation between spending on tobacco and spending on
alcohol?

- A. 0.99
- B. -0.8
- C. 0.8
- D. 0.08

Answer: D

4. In a study of 1991 model cars, a researcher computed the least-squares regression line of price (in dollars) on horsepower. He obtained the following equation for this line.

\[
\text{price} = -6677 + 175 \times \text{horsepower}.
\]

Based on the least-squares regression line, what would we predict the cost of a 1991 model car with horsepower equal to 200 to be?

- A. $41,677
- B. $13,354
- C. $35,000
- D. $28,323

Answer: D

5. In the National Hockey League a good predictor of the percentage of games won by a team is the number of goals the team allows during the season. Data were gathered for all 30 teams in the NHL and the scatterplot of their Winning Percentage against the number of Goals Allowed in the 2006/2007 Season with a fitted least-squares regression line is provided:

The least-squares regression line and \( r^2 \) were calculated to be

\[
\text{Winning \%} = 116.95 - 0.26 \times \text{Goals Allowed}, \quad r^2 = 0.69
\]

Reference: Ref 2-5

Fill in the blank:
(Give your answer to 2 decimal places.)

The Montréal Canadiens team allowed 251 goals in 2006/2007. Using the least-squares regression line, the prediction of the team's Winning Percentage would be ______ %.
Answer: 51.69

6. John’s parents recorded his height at various ages between 36 and 66 months. Below is a record of the results:

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>36</th>
<th>48</th>
<th>54</th>
<th>60</th>
<th>66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (inches)</td>
<td>34</td>
<td>38</td>
<td>41</td>
<td>43</td>
<td>45</td>
</tr>
</tbody>
</table>

Reference: Ref 2-6

Which of the following is the equation of the least-squares regression line of John's height on age? (Note: You do not need to directly calculate the least-squares regression line to answer this question.)

- ○ A. Height = 12 \times (Age)
- ○ B. Height = Age/12
- ○ C. Height = 60 - 0.22 \times (Age)
- ○ D. Height = 22 - 3 + 0.34 \times (Age)

Answer: D

7. Data were obtained from the A&W Web site for the Total Fat in grams and the Protein content in grams for various items on their menu. Some summary statistics are also provided:

<table>
<thead>
<tr>
<th>Item</th>
<th>Total Fat (grams)</th>
<th>Protein (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kid's Cheeseburger</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Kid’s Hamburger</td>
<td>22</td>
<td>21</td>
</tr>
<tr>
<td>Original Bacon Cheeseburger</td>
<td>33</td>
<td>27</td>
</tr>
<tr>
<td>Original Bacon Double Cheeseburger</td>
<td>48</td>
<td>45</td>
</tr>
<tr>
<td>Original Double Cheeseburger</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
<td>Papa Burger</td>
<td>42</td>
<td>41</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Total Fat</th>
<th>Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>35.167</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>10.591</td>
</tr>
</tbody>
</table>

Correlation: r = 0.983

Reference: Ref 2-9

The slope of the least-squares regression line for Total Fat on Protein is

- ○ A. 0.966.
- ○ B. 0.962.
- ○ C. 1.005.
- ○ D. -0.998.
- ○ E. 2.170.

Answer: C

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<td>32.833</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>10.591</td>
<td>10.362</td>
</tr>
</tbody>
</table>

Correlation $r = 0.983$

The intercept for the least-squares regression line of Total Fat on Protein is

- **A.** 0.962.
- **B.** -0.998.
- **C.** 0.966.
- **D.** 1.005.
- **E.** 2.170.

*Answer: E*