1. A survey was done asking students what type of athletic shoes they wear and which type they would buy the next time they bought shoes. The results are shown in the chart below.

<table>
<thead>
<tr>
<th>Type of Shoe Worn</th>
<th>Type of Shoe Students Would Buy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennis Shoes (T)</td>
<td>40% Tennis Shoes (T) 25% Running Shoes (R) 35% Basketball Shoes (B)</td>
</tr>
<tr>
<td>Running Shoes (R)</td>
<td>60% Running Shoes (R) 15% Tennis Shoes (T) 25% Basketball Shoes (B)</td>
</tr>
</tbody>
</table>

Which matrix represents these data?

A

<table>
<thead>
<tr>
<th>T</th>
<th>B</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>35%</td>
<td>25%</td>
</tr>
<tr>
<td>15%</td>
<td>25%</td>
<td>60%</td>
</tr>
</tbody>
</table>

B

<table>
<thead>
<tr>
<th>T</th>
<th>B</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>25%</td>
<td>35%</td>
</tr>
<tr>
<td>60%</td>
<td>15%</td>
<td>25%</td>
</tr>
</tbody>
</table>

C

<table>
<thead>
<tr>
<th>T</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>25%</td>
<td>15%</td>
</tr>
<tr>
<td>35%</td>
<td>25%</td>
</tr>
</tbody>
</table>

D

<table>
<thead>
<tr>
<th>T</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>35%</td>
<td>60%</td>
</tr>
<tr>
<td>15%</td>
<td>25%</td>
</tr>
</tbody>
</table>
2. The matrix below displays the average SAT scores of eleventh-grade and twelfth-grade students over a three-year period at a high school.

<table>
<thead>
<tr>
<th>Carter High School</th>
<th>Average SAT Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1998</td>
</tr>
<tr>
<td>Grade 11</td>
<td>976</td>
</tr>
<tr>
<td>Grade 12</td>
<td>1,028</td>
</tr>
</tbody>
</table>

What was the change in average SAT scores of the twelfth-graders from 1998 to 2000?

A. Scores increased by 225 points.
B. Scores increased by 89 points.
C. Scores decreased by 225 points.
D. Scores decreased by 89 points.

3. Matrices $P$ and $Q$ are shown below.

\[
P = \begin{bmatrix} 3 & 2 \\ 6 & 9 \\ 1 & 0 \end{bmatrix} \quad \quad Q = \begin{bmatrix} -3 & -7 \\ -2 & -6 \\ 4 & 0 \end{bmatrix}
\]

What is $P - Q$?

A. \[
\begin{bmatrix} -6 & -9 \\ -8 & -15 \\ 3 & 0 \end{bmatrix}
\]
B. \[
\begin{bmatrix} 0 & -5 \\ 4 & 3 \\ 5 & 0 \end{bmatrix}
\]
C. \[
\begin{bmatrix} 0 & 5 \\ -4 & -3 \\ -5 & 0 \end{bmatrix}
\]
D. \[
\begin{bmatrix} 6 & 9 \\ 8 & 15 \\ -3 & 0 \end{bmatrix}
\]
4. Nagel’s Bagel Shop makes a monthly report to summarize the cost of making a single bagel of each type and the price at which it is sold. Matrix $C$ represents cost, and matrix $P$ represents selling price.

$$
C = \begin{bmatrix}
0.12 & 0.17 & 0.13 & 0.15 \\
\end{bmatrix} \quad \ quad 

Which matrix represents the profit on a single bagel of each type?

\[ \text{(Profit} = \text{Selling Price} - \text{Cost}) \]

A. \[ \begin{bmatrix}
0.57 & 0.67 & 0.63 & 0.65 \\
\end{bmatrix} \]

B. \[ \begin{bmatrix}
0.33 & 0.33 & 0.35 & 0.37 \\
\end{bmatrix} \]

C. \[ \begin{bmatrix}
0.33 & 0.33 & 0.33 & 0.33 \\
\end{bmatrix} \]

D. \[ \begin{bmatrix}
0.33 & 0.33 & 0.37 & 0.35 \\
\end{bmatrix} \]
5. The table below shows the number of doctors in Bingham City from 1960 to 1986.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Doctors (y)</td>
<td>2,937</td>
<td>3,511</td>
<td>3,754</td>
<td>4,173</td>
<td>4,741</td>
<td>5,019</td>
<td>5,102</td>
</tr>
</tbody>
</table>

If a linear regression model is fit to this data, which equation would best represent the data? (let $x =$ the number of years after 1960)

A $y = 1.01x - 3,500$
B $y = 82x + 2,937$
C $y = 83x + 2,929$
D $y = 83x + 2,944$
6. The graph shows a scatterplot of the number of compact discs (CDs) sold at a music store during part of the 1980s and early 1990s. An equation for the line of best fit for the given data is \( y = 518x - 43,886 \).

What is the difference between the observed value and the predicted value at \( x = 88 \)?

A 1,698
B 979
C 518
D 201
7. The table shows the relationship between calories and fat grams contained in orders of fried chicken from various restaurants.

<table>
<thead>
<tr>
<th>Calories</th>
<th>305</th>
<th>410</th>
<th>320</th>
<th>500</th>
<th>510</th>
<th>440</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat Grams</td>
<td>28</td>
<td>34</td>
<td>28</td>
<td>41</td>
<td>42</td>
<td>38</td>
</tr>
</tbody>
</table>

Assuming the data can best be described by a linear model, how many fat grams would be expected to be contained in a 275-calorie order of fried chicken?

A 28
B 27
C 25
D 22

End of Goal 3 Sample Items

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1. Objective 3.01
Use matrices to display and interpret data.
Thinking Skill: Organizing   Correct Answer: A

2. Objective 3.01
Use matrices to display and interpret data.
Thinking Skill: Applying   Correct Answer: A

3. Objective 3.02
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying   Correct Answer: D

4. Objective 3.02
Operate (addition, subtraction, scalar multiplication) with matrices to solve problems.
Thinking Skill: Applying   Correct Answer: D

5. Objective 3.03
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make
Thinking Skill: Applying   Correct Answer: C

6. Objective 3.03
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make
Thinking Skill: Analyzing   Correct Answer: D

7. Objective 3.03
Create linear models for sets of data to solve problems. a) Interpret constants and coefficients in the context of the data. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make
Thinking Skill: Analyzing   Correct Answer: C