S.ID.B.6: Residuals

1 After performing analyses on a set of data, Jackie examined the scatter plot of the residual values for each analysis. Which scatter plot indicates the best linear fit for the data?

1) ![Scatter Plot 1]
2) ![Scatter Plot 2]
3) ![Scatter Plot 3]
4) ![Scatter Plot 4]

2 Which statistic would indicate that a linear function would not be a good fit to model a data set?

1) $r = -0.93$
2) $r = 1$

3 Use the data below to write the regression equation $(y = ax + b)$ for the raw test score based on the hours tutored. Round all values to the nearest hundredth.

<table>
<thead>
<tr>
<th>Tutor Hours, $x$</th>
<th>Raw Test Score</th>
<th>Residual (Actual – Predicted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>1.3</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>1.9</td>
</tr>
<tr>
<td>3</td>
<td>35</td>
<td>-6.4</td>
</tr>
<tr>
<td>4</td>
<td>47</td>
<td>-0.7</td>
</tr>
<tr>
<td>5</td>
<td>56</td>
<td>2.0</td>
</tr>
<tr>
<td>6</td>
<td>67</td>
<td>6.6</td>
</tr>
<tr>
<td>7</td>
<td>62</td>
<td>-4.7</td>
</tr>
</tbody>
</table>

Equation: ___________________________

Create a residual plot on the axes below, using the residual scores in the table above.
Based on the residual plot, state whether the equation is a good fit for the data. Justify your answer.

Using the plot, assess the fit of the line for these residuals and justify your answer.
5 The residual plots from two different sets of bivariate data are graphed below.

Explain, using evidence from graph A and graph B, which graph indicates that the model for the data is a good fit.
S.ID.B.6: Residuals
Answer Section

1 ANS: 3
For a residual plot, there should be no observable pattern and a similar distribution of residuals above and below the x-axis.

REF: 011624ai

2 ANS: 3
A correlation coefficient close to –1 or 1 indicates a good fit. For a residual plot, there should be no observable pattern and a similar distribution of residuals above and below the x-axis.

REF: fall1303ai

3 ANS:

\[ y = 6.32x + 22.43 \]

Based on the residual plot, the equation is a good fit for the data because the residual values are scattered without a pattern and are fairly evenly distributed above and below the x-axis.

REF: fall1314ai

4 ANS:

The line is a poor fit because the residuals form a pattern.

REF: 081431ai
ANS:
Graph A is a good fit because it does not have a clear pattern, whereas Graph B does.

REF: 061531ai