Group Members Present:

__________________________________________
__________________________________________
__________________________________________
__________________________________________

Directions:

1. You will be shown a graph of “your opponent’s” position vs. time. You will also be shown a best fit curve of this graph.
2. You will then be given a constant velocity car and you will need to do what ever you would like to determine that car’s velocity.
3. Your task is to determine at what time (seconds) the two cars will run into each other if they start 2 meters apart.
4. Print out a copy of the data table, original graph, and any additional graphs needed to produce a linear graph for your car. (turn these in with this sheet)
5. On this sheet below write out the final form of the mathematical model that fits your car’s graph.
6. On this sheet below show all the mathematical steps you took to arrive at your answer.

Mathematical model used (equation):

Work (including all necessary calculations):

Time guessed by lab group: ______ Actual time: ______

**Your teacher will be using the following formula to calculate percent error

\[ \text{%error} = \left( \frac{\text{theoretical} - \text{actual}}{\text{theoretical}} \right) \times 100\% \]

Percent Difference: ______

Grading: 15 points for diagrams, graphs and complete solution (see rubric on back)
10 points for accuracy:
10 points for 0-1% difference 5 points for 10-11% difference
9 points for 2-3% difference 4 points for 12-13% difference
8 points for 4-5% difference 3 points for 14-15% difference
7 points for 6-7% difference 2 points for 16-17% difference
6 points for 8-9% difference 1 point for 18-19% difference
<table>
<thead>
<tr>
<th>Criteria</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Graphs are correctly labeled</td>
<td>No or missing</td>
<td>Small errors made</td>
<td>correct</td>
<td></td>
</tr>
<tr>
<td>✓ Data collected for graphs is of acceptable quality</td>
<td>Not enough data points or poor quality</td>
<td>Data collected is of questionable quality</td>
<td>High quality with correct range and number of data points</td>
<td>x1.5</td>
</tr>
<tr>
<td>✓ Graph is linearized (if necessary) and a best fit curve has been applied</td>
<td>No &amp;/or missing</td>
<td>Not correctly linearized or incorrect curve equation</td>
<td>Linearized &amp; best fit curve applied</td>
<td></td>
</tr>
<tr>
<td>✓ Correct mathematical model is used based on given data</td>
<td>No or missing</td>
<td>Small mistake made</td>
<td>correct</td>
<td></td>
</tr>
<tr>
<td>✓ Work is logical and easy to follow</td>
<td>No or missing</td>
<td>Hard to follow</td>
<td>Easy to follow</td>
<td>x2</td>
</tr>
<tr>
<td>✓ Solution is determined using correct method</td>
<td>No or missing</td>
<td>Small mistakes made or group got stuck</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td></td>
<td></td>
<td>15</td>
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