Principal Author Jo Eary

Prerequisite Section 3.4, Linear regression

Comments
Make sure you give the probes time to adjust before you record the readings and change water baths.

We seemed to get better results when we started with the hot water baths and worked our way down toward lower temperatures.

Sample Data

<table>
<thead>
<tr>
<th>Temperature (kelvins)</th>
<th>333.09</th>
<th>315.73</th>
<th>303.90</th>
<th>298.01</th>
<th>284.10</th>
<th>276.26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure (atm)</td>
<td>1.024</td>
<td>0.974</td>
<td>0.937</td>
<td>0.913</td>
<td>0.863</td>
<td>0.839</td>
</tr>
</tbody>
</table>

Answers to Questions

1. Let $T$ denote the temperature (in kelvins) and $P$ the pressure (in atm). Then the regression line is $P = 0.0033T - 0.0746$.

2. Here is the graph.

3. The slope is 0.0033 atm per kelvin. This means increasing the temperature by 1 kelvin causes an increase of 0.0033 atm in pressure.

4. The vertical intercept should be 0.

5. Yes, our data supports the pressure-temperature law. The regression line approximates the data well, and the vertical intercept of 0.0746 is small relative to the pressure readings.