5. [10 points] Vikram takes a non-stop train ride from Chennai straight to New Delhi. Let \( g(t) \) be the distance (in km) of Vikram’s train from Chennai \( t \) hours after his ride begins. Assume that the function \( g \) is increasing and invertible, and that \( g \) and \( g^{-1} \) are differentiable. Several values for \( g(t) \) are shown in the table below.

<table>
<thead>
<tr>
<th>( t )</th>
<th>( 0 )</th>
<th>( 2 )</th>
<th>( 5 )</th>
<th>( 6.5 )</th>
<th>( 10 )</th>
<th>( 11 )</th>
<th>( 16 )</th>
<th>( 28 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( g(t) )</td>
<td>0</td>
<td>132</td>
<td>346</td>
<td>448</td>
<td>692</td>
<td>742</td>
<td>1152</td>
<td>2180</td>
</tr>
</tbody>
</table>

a. [3 points] Estimate the instantaneous velocity of Vikram’s train 6 hours after his ride begins. Show your work and include units.

**Answer:**

b. [5 points] Suppose \( (g^{-1})'(700) = C \), where \( C \) is some constant.

(i) Using the data in the table above, find the best possible estimate of \( C \). Show your work.

**Answer:**

(ii) In interpreting the equation \( (g^{-1})'(700) = C \), what are the units on 700 and \( C \)?

**Answer:** Units on 700 are ___________________________

**Answer:** Units on \( C \) are ___________________________

c. [2 points] Let \( R(t) \) be the total rainfall (in cm) in New Delhi during the first \( t \) hours of Vikram’s train ride. Express the following statement with a single mathematical equation: “Over the first 900 km of Vikram’s train ride, it rained 3.6 cm in New Delhi.”

**Answer:**