Simplify and justify all answers unless otherwise directed.
Show your work, and use proper notation.

1. Using the definition of a derivative, find the derivative of \( f(x) = Ax^2 \) when \( x = -1 \), where \( A \) is a positive constant. Simplify your answer.
An answer that does not use the definition of a derivative will be marked incorrect.
2. A reaction’s rate depends on temperature; the rate is given by \( v(T) = \frac{5T^4}{3 + T^4} \), where \( T \) is the temperature.

Find the half-maximal reaction rate.

3. Sketch the derivative of the function shown below.
4. Using the approximation method we learned in class, sketch the function \( y = \frac{3x^2}{9 + x^2} \).
Make sure you include both positive and negative values of \( x \).

5. The table below gives a few values of the continuous function \( f(x) \). What is the slope of the secant line of \( f(x) \) through the points where \( x = 3 \) and \( x = 7 \)?

<table>
<thead>
<tr>
<th>( x )</th>
<th>1.5</th>
<th>2.3</th>
<th>3.0</th>
<th>4.7</th>
<th>5.9</th>
<th>6.9</th>
<th>7.0</th>
<th>8.0</th>
<th>8.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f(x) )</td>
<td>3</td>
<td>2</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

6. Which of the previous questions did you get completely right?
Fill in the appropriate box(es).

\( \square \) I didn’t get any of the questions completely right.