1. \( f(t) = 4t^2 + 3t + 2 \)

   a. \[
   \frac{f(5+h) - f(5)}{h} = \frac{[4(5+h)^2 + 3(5+h) + 2] - [45^2 + 35 + 2]}{h}
   \]
   
   \[
   = \frac{[200 + 80h + 4h^2 + 15 + 3h + 2] - [225 + 15 + 2]}{h}
   \]
   
   \[
   = \frac{85h + 4h^2 + 3h}{h} = 85 + 4h + 3
   \]

   b. \( \frac{f(5+h) - f(5)}{h} = \text{avg velocity over } [5, 5+h] \) (if \( h > 0 \))

   c. \[
   \lim_{h \to 0} \frac{f(5+h) - f(5)}{h} = \lim_{h \to 0} 85 + 4h + 3 = 85 + 3 = f'(5)
   \]

   d. \( f'(5) = 43 \)

2. \( f(x) = x^5 + 5x^3 - 2 \)

Use bisection to find root within \( \frac{1}{32} \)

noting

\[
\begin{align*}
f(0) &= -2 < 0, \quad f(1) &= 4 > 0
\end{align*}
\]
<table>
<thead>
<tr>
<th>Root 11</th>
<th>Midpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0, 1]</td>
<td>1/2</td>
</tr>
<tr>
<td>f(1/2) = -1.34375</td>
<td>3/4</td>
</tr>
<tr>
<td>f(3/4) ≈ 0.34668</td>
<td>5/8</td>
</tr>
<tr>
<td>f(5/8) ≈ -0.68393</td>
<td>11/16</td>
</tr>
<tr>
<td>f(11/16) ≈ -0.221654</td>
<td>23/32</td>
</tr>
<tr>
<td>f(23/32) ≈ 0.048355</td>
<td></td>
</tr>
</tbody>
</table>

(Note: My calculator gives the root as 0.7138075, approximately)