(10) I. The distance, $s$, a car has traveled on a trip is shown in the table as a function of the time, $t$, since the trip started.

<table>
<thead>
<tr>
<th>$t$ (hours)</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s$ (km)</td>
<td>0</td>
<td>3</td>
<td>12</td>
<td>27</td>
<td>48</td>
<td>75</td>
<td>95</td>
</tr>
</tbody>
</table>

A) Find the average velocity of the car between $t = 2$ hours and $t = 10$ hours.

B) Estimate the velocity of the car at $t = 5$ hours.
(20) II. Evaluate the limits if they exist. If they do not exist, explain why not:

A. \[ \lim_\limits{h \to 0} \frac{(4 + h)^2 - 16}{h} \]

B. \[ \lim_\limits{x \to \infty} \frac{4x^3 - 3}{x^2 + 6x^3} \]

C. \[ \lim_\limits{h \to 0} \frac{3h}{h} \]

D. \[ \lim_\limits{h \to 0} \frac{h}{h} \]
III. If \( g(v) \) is the fuel efficiency, in kilometers per liter, of a car going at \( v \) kilometers per hour, 

A) what are the units of \( g'(90) \)?

B) What is the practical meaning of the statement \( g'(60) = -0.63 \)?

IV. Find the equation of the tangent to the graph of the function \( f(x) = 5x^3 - 2 \) at the point whose x-coordinate is 1.
(10) V. Sketch below a graph of a function \( f \) with the following properties:

1) The domain of \( f \) is \([-5, 5]\).
2) \( f' \) is negative between \(-3\) and \(3\).
3) \( f \) is concave down on the interval \([-5, 0]\).
4) \( f'' \) is nonnegative on the interval \([0, 5]\).
5) \( f \) increases on the intervals \([-5, -3]\) and \([3, 5]\).
6) \( f'(-3) = f'(3) = 0 \).
VI. Sketch below a graph of a function \( f \) with the following properties:

1) The domain of \( f \) is \([-2, 2]\).

2) \( f \) is continuous at \( x = 1 \), but \( f \) is not differentiable at \( x = 1 \).

3) \( f \) is not continuous at \( x = 0 \).
(32) VII. Find the derivatives of the following functions:

A) \[ t^4 - 2\sqrt{t} \]

B) \[ \frac{x^2 + 5x}{x^2} \]
C) \(7t - 2t^{3/4}\)

D) \(\frac{1 - 3e^x}{e^x}\)