1. \( f(x) = \begin{cases} \frac{1}{x} & 1 < x < 3 \\ \sqrt{x-3} & x \geq 3 \end{cases} \)

1a. \( \lim_{x \to 1^-} f(x) \).

1b. \( \lim_{x \to 1^+} f(x) \).

1c. \( \lim_{x \to 1} f(x) \).

2. Determine \( \lim_{x \to -4} \frac{x^2 + 5x + 4}{x^2 + 3x - 4} \).

3. Determine \( \lim_{x \to 0} \frac{\sin 4x}{\sin 6x} \).

4. Use the limit definition of derivative to calculate \( f'(x) \)
where \( f(x) = x^2 - 8x + 9 \).
For the remaining problems, you do not need to use the limit definition of derivative.

5. Determine \( f'(x) \) where \( f(x) = x^2 - \frac{1}{\sqrt[4]{x^5}} \).

6. Determine \( f'(x) \) where \( f(x) = \frac{x^2 + x - 2}{x^3 + 6} \).

7. Find the point(s) on the curve \( y = x^3 - x^2 - x + 1 \) where the tangent line is horizontal.

8. Write an equation of the tangent line to \( y = 1 - x^3 \) at \((0, 1)\).

9. The position of a particle is given by \( s = t^3 - 4.5t^2 - 7t \).

When does the velocity reach 5 m/s?