1. Prove, using the precise definition of limit, that the function

\[ f(x) = -x \]

is continuous at \( x = 1 \).

2. Find the equation of the tangent line to the graph of the function \( f(x) = \frac{1}{x} \) at the point \((1, 1)\).

3. Below is a graph of the function \( f \):

(a) Sketch a graph of the function \( g \) where \( g(x) = f\left(\frac{x}{2} + 1\right) \).

(b) Sketch a graph of the function \( f' \).

4. Find the value of each of the following limits, or explain why the limit is \(+\infty\), or \(-\infty\), or does not exist for another reason:

(a) \( \lim_{x \to 0} \frac{|x|}{x} \);

(b) \( \lim_{x \to 1} \frac{x^3 - 1}{x^2 - 1} \);

(c) \( \lim_{x \to 3^-} \frac{x - 4}{x - 3} \).
(Note that part (c) is a one-sided limit.) You should justify your answers.

5. John is driving from Boston to New York. The function \( f(x) = 10x(10 - x) \) for \( 0 \leq x \leq 4 \) describes John’s distance from Boston (measured in miles) at a time \( x \) hours after leaving. What is John’s speed when he is 160 miles from Boston?