\textbf{Problem 1: (6 points)} Find the average rate of the function \( y = x^2 - x \) with respect to \( x \) over the interval \([1, 1+h]\). What will happen when \( h \) approaches 0? What is the slope of the tangent line to the curve at that point (1,0)?

\textbf{Problem 2: (18 points)}

(i) Use the precise definition of the limit to show that \( \lim_{x \to 2} (2-3x) = -4 \).

If \( \varepsilon = 0.06 \), find the largest corresponding \( \delta > 0 \) which satisfies the definition.

(ii) For the limit \( \lim_{x \to 3} \sqrt{x-2} = 1 \), find a \( \delta > 0 \) that works for \( \varepsilon = 1 \) in the definition of the limit.
(iii) If \( \lim_{x \to 1} \frac{2 + x - f(x)}{x - 1} = 5 \), find \( \lim_{x \to 1} f(x) \). Justify your answer.

**Problem 3: (18 points)** Find the limit if it exists

a) \( \lim_{x \to 3} \frac{x + 3}{x^2 + x - 6} \)

b) \( \lim_{x \to 4} \frac{4x - x^2}{2 - \sqrt{x}} \)

c) \( \lim_{x \to 1} (1 - x)^2 \cos \frac{6}{1 - x^2} \) (Use the sandwich Theorem)