Instructions: This quiz is closed books and closed notes. You may use calculators. Work that is erased or crossed out will not be graded.

1. Evaluate the following limits.
   a. \( \lim_{x \to 0} \frac{1}{x} \)
   b. \( \lim_{x \to 2} \frac{x^2 - 3x + 2}{x - 2} \)
   c. \( \lim_{x \to 3} \frac{x^2 - 3x + 2}{x - 2} \)

2. Continuity.
   a. Is the function \( f(x) = \begin{cases} 2x, & \text{if } x < 1 \\ 100, & \text{if } x \geq 1 \end{cases} \) continuous at \( x = 1 \)? Why or why not?

   b. Is the function \( g(x) = \frac{x^2}{10(x)} \) continuous at \( x = 0 \)? Why or why not?

3. Let \( f(t) = 5t^2 \).
   a. Find the equation for the secant line between the points (1, 5) and (2, 20) on the graph of the function.

   b. Find i) the average rate of change of \( f(t) \) as a function of \( \Delta t \) near \( t_0 = 1 \). ii) the instantaneous rate of change at time \( t_0 = 1 \) (use the definition of the instantaneous rate of change as a limit).

Extra Credit: Most knotted proteins contain trefoil knots (represented in diagrams with three crossings), but Virnay and coworkers have discovered that the protein Ubiquitin hydrolase has a knot with ____________ crossings.