Proofs using the \( \varepsilon - \delta \) definition of the derivative

(1) Let \( f(x) = 2(x - 1)^2 + \frac{1}{2} \).

(a) Use the definition of \( \frac{df}{dx}(x_0) \) to show that \( \frac{df}{dx}(1) = 0 \).

(b) Use the definition of \( \frac{df}{dx}(x_0) \) to show that \( \frac{df}{dx}(x_0) = 4(x_0 - 1) \).

(2) Let \( f(x) = |x| \). Use the definition of \( \frac{df}{dx}(x_0) \) to show that \( \frac{df}{dx}(0) \) does not exist.