1. (3 points) Show that \( x = \sin(\pi x) \) has a solution in the interval \((1/2, 1)\).

2. (3 points) True or false (0.5 points each):

(a) \( f'(x) \) is defined for all \( x \) \( \implies \) \( f \) is continuous.

(b) \( \lim_{h \to 0} f(x + h) = f(x) \iff f \) is continuous at \( x \).

(c) \( f \) is continuous \( \implies \) \( f'(x) \) is defined for all \( x \)

(d) \( f(x) = -\cos(x) \) then \( f'(\pi/6) = 1/2 \).

(e) \( f(x) \geq g(x) \) for all \( x \) \( \implies \) \( f'(x) \geq g'(x) \) for all \( x \).

(f) \( f'(x) \geq 0 \) for all \( x \), then \( f \) is non-decreasing.

(There is one more problem on the back)
3. (4 points) Using the *definition* of the derivative, compute

\[
\frac{d}{dx} \sqrt{1 - 2x}.
\]