1. [10 points] For each of the following statements, circle True if the statement is always true and circle False otherwise.

a. [2 points] If \( j'(x) \) is continuous everywhere and changes from negative to positive at \( x = a \), then \( j \) has a local minimum at \( x = a \).

True  False

b. [2 points] If \( f \) and \( g \) are differentiable increasing functions and \( g(x) \) is never equal to 0, then the function \( h(x) = \frac{f(x)}{g(x)} \) is also a differentiable increasing function.

True  False

c. [2 points] If \( k \) is a differentiable function with exactly one critical point, then \( k \) has either a global minimum or global maximum at that point.

True  False

d. [2 points] If \( F \) and \( F' \) are differentiable functions and \( F''(2) = 0 \), then \( F \) has a point of inflection at \( x = 2 \).

True  False

e. [2 points] If \( f \) is a differentiable function with \( f(a) = b \) and \( f' \) is always positive, then \( f'(a) \left( (f^{-1})'(b) \right) = 1 \).

True  False