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 $h(x) = \dfrac{f(x)}{g(x)}$ 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