1. For the following questions select true if the statement is *always* true, and false otherwise. Each question is worth 1 point.

(a) If \( f \) is differentiable and \( f'(p) = 0 \) or \( f'(p) \) is undefined, then \( f(p) \) is either a local maximum or a local minimum.

True  False

(b) For \( f \) a twice differentiable function, if \( f' \) is increasing, then \( f \) is concave up and increasing.

True  False

(c) The global maximum of \( f(x) = x^2 \) on every closed interval is at one of the endpoints of the interval.

True  False

(d) If \( f(x) \) has an inverse function \( g(x) \), then \( g'(x) = 1/f'(x) \).

True  False

(e) If a function is periodic with period \( c \), then so is its derivative.

True  False

(f) If \( C(q) \) represents the cost of producing a quantity \( q \) of goods, then \( C''(0) \) represents the fixed costs.

True  False

(g) If a differentiable function \( f(x) \) has a global maximum on the interval \( 0 \leq x \leq 10 \) at \( x = 0 \), then \( f'(x) \leq 0 \) for \( 0 \leq x \leq 10 \).

True  False

(h) If \( f(x) \) is differentiable and concave up, then \( f'(a) < \frac{f(b) - f(a)}{b - a} \) for \( a < b \).

True  False

(i) If you zoom in with your calculator on the graph of \( y = f(x) \) in a small interval around \( x = 10 \) and see a straight line, then the slope of that line equals the derivative \( f'(10) \).

True  False

(j) If \( f'(x) \geq 0 \) for all \( x \), then \( f(a) \leq f(b) \) whenever \( a \leq b \).

True  False