1. (2 points each) For each of the following, circle all the statements which are **always** true. For the cases below, one statement may be true, **or** both **or** neither of the statements may be true.

   (a) Let $x = c$ be an inflection point of f. Assume f' is defined at c.

   - If L is the linear approximation to f near c, then $L(x) > f(x)$ for $x > c$.
   - The tangent line to the graph of f at $x = c$ is above the graph on one side of c and below the graph on the other side.

   (b) The differentiable function g has a critical point at $x = a$.

   - If $g''(a) > 0$, then a is a local minimum.
   - If a is a local maximum, then $g''(a) < 0$.

   (c) The derivative of $g(x) = (e^x + \cos x)^2$ is

   - $g'(x) = 2(e^x - \sin x)(e^x + \cos x)$.
   - $g'(x) = 2e^{2x} + 2(e^x \cos x - e^x \sin x)$.

   (d) A continuous function f is defined on the closed interval $[a, b]$.

   - f has a global maximum on $[a, b]$.
   - f has a global minimum on $[a, b]$.

   (e) Consider the family of functions $e^{-(x-a)^2}$.

   - Every function in this family has a critical point at $x = 0$.
   - Some function in this family has a local maximum at $x = 2$.