

1. [13 points] For each problem below, circle **ALL** of the statements that **MUST** be true. (The four parts (a)-(d) are independent of each other. No explanations are required.)

a. [3 points] Suppose f is a differentiable function which is concave up on its entire domain, $(-\infty, \infty)$.

$\lim_{x \rightarrow 1} f(x) = f(1)$

$f(2) \geq f(1)$

$f'(2) \geq f'(1)$

b. [3 points] Suppose that $h(t)$ gives the height of a ball, measured in feet above ground level, t seconds after it is thrown off a bridge. Assume that the derivative of h is given by the formula $h'(t) = -32t + 64$.

The ball reaches its maximum height 2 seconds after being thrown.

The ball reaches a maximum height of 64 feet from the ground.

The bridge is 64 feet off the ground.

c. [4 points] Suppose that A and B are positive constants and $A < B$.

$(\ln e^A)(\ln e^B) = A + B$

$\ln(10^{-A}) < 0$

$\ln(A^2 + B) = 2 \ln A + \ln B$

$\log A < \log B$

d. [3 points] Suppose that $f(x) = -Ae^{-Bx}$ for some positive constants A and B .

$f'(x) > 0$ for all x

f' is increasing

f is increasing