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 $f(t) = t^2 + 2t$.

- $\dfrac{d}{dt}\displaystyle\int_0^1 f(t)\,dt = t^2 + 2t.$
- $\dfrac{d}{dt}\displaystyle\int_0^1 f(t)\,dt = 0.$

(b) Let $g(x)$ be continuous on the interval $[0, 1]$.

- The limit $\lim\limits_{n\to\infty}\left(\sum\limits_{k=1}^{n} g(x_k)\cdot\dfrac{1}{n}\right)$ exists.
- The limit $\lim\limits_{h\to 0}\dfrac{g(0.5+h)-g(0.5)}{h}$ exists.

(c) Suppose $\displaystyle\int_{-2}^{2} F(x)\,dx = 5.$

- F is not an odd function.
- For some c in the interval $[-2, 2]$, $F(c) > 1$.

(d) Suppose h is a differentiable function defined on $[a, b]$, with antiderivative H. Assume $h(t) > 0$ for all t in $[a, b]$

- h has either a local maximum or minimum (or both) on (a, b).
- H has a local maximum at b.