10. [10 points] For the following questions, determine if the statement is ALWAYS true, SOMETIMES true, or NEVER true, and circle the corresponding answer. Justification is not required.

a. [2 points] If $a(x)$ is a concave up differentiable function, and RIGHT(8) and TRAP(8) are used to estimate $\int_{-1}^{1} a(x)\ dx$, then

$$\text{RIGHT}(8) < \text{TRAP}(8).$$

Circle one: **ALWAYS** **SOMETIMES** **NEVER**

b. [2 points] If $b(x)$ is an increasing, concave down differentiable function, and TRAP(10) and MID(10) are used to estimate $\int_{-1}^{1} b(x)\ dx$, then

$$\text{MID}(10) < \int_{-1}^{1} b(x)\ dx < \text{TRAP}(10).$$

Circle one: **ALWAYS** **SOMETIMES** **NEVER**

c. [2 points] Suppose that $f(x)$ is a decreasing differentiable function, and that LEFT(2) and LEFT(4) are used to estimate $\int_{-1}^{1} f(x)\ dx$. Then

$$\int_{-1}^{1} f(x)\ dx \leq \text{LEFT}(4) \leq \text{LEFT}(2).$$

Circle one: **ALWAYS** **SOMETIMES** **NEVER**

d. [2 points] Suppose that $g(x)$ is a continuous function with an antiderivative $G(x)$ which satisfies $G(3) = 5$. Suppose that $\int_{3}^{7} g(t)\ dt = 4$, and let $H(x) = \int_{7}^{x} g(t)\ dt$. Then $G(50) - H(50) = 9$.

Circle one: **ALWAYS** **SOMETIMES** **NEVER**

e. [2 points] Suppose that $h(x)$ is a continuous odd function. Then

$$\int_{-1}^{1} x^2 \left(h(x)\right)^2\ dx = 2\int_{0}^{1} x^2 \left(h(x)\right)^2\ dx.$$

Circle one: **ALWAYS** **SOMETIMES** **NEVER**