3. [12 points] Indicate if each of the following is true or false by circling the correct answer. No justification is required.

a. [2 points] Let $F(x)$ be an antiderivative of a function $f(x)$. Then $F(2x)$ is an antiderivative of the function $f(2x)$.

True False

b. [2 points] If $f(x)$ is a linear function on $[0,1]$, then the midpoint rule computes the exact value of $\int_0^1 f(x)dx$.

True False

c. [2 points] If $f(x)$ is a negative function that satisfies $f'(x) > 0$ for $0 \leq x \leq 1$. Then the right hand sums always yield an underestimate for the value of $\int_0^1 (f(x))^2 dx$.

True False

d. [2 points] If a and b are positive constants, then $\int e^{ax^2+b}dx = \frac{1}{2ax}e^{ax^2+b} + C$.

True False

e. [2 points] The average value of $f(x)g(x)$ on an interval $[a,b]$ is the average value of $f(x)$ on $[a,b]$ times the average value of $g(x)$ on $[a,b]$.

True False

f. [2 points] If $k > 0$ is a constant, the arclength of the function $y = kf(x)$ on an interval $[a,b]$ is k times the arclength of $y = f(x)$ on $[a,b]$.

True False