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 \( f(2x) \).

\[ \text{True} \quad \text{False} \]

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

\[ \text{True} \quad \text{False} \]

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 \( \int_0^1 (f(x))^2dx \).

\[ \text{True} \quad \text{False} \]

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

\[ \text{True} \quad \text{False} \]

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 \([a, b]\).

\[ \text{True} \quad \text{False} \]

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 \([a, b]\).

\[ \text{True} \quad \text{False} \]