1. [12 points] Indicate if each of the following is true or false by circling the correct answer. No justification is required.

a. [2 points] If f and g are continuous functions over the interval $[a, b]$, then the average value of $f(x)g(x)$ over that interval is the average value of f times the average value of g over that interval.

True [False]

Solution:

b. [2 points] The units of $\int f(x)dx$ are the same as the units of $f(x)$.

True [False]

Solution:

c. [2 points] If $f(x)$ is even and $\int_0^2 f(x)dx = 3$, then $\int_{-2}^2 (f(x) - 4)dx = -10$.

[True] False

d. [2 points] The center of mass of an object can be outside of the object.

[True] False

Solution:

e. [2 points] Over the interval $[0, 1]$, if LEFT(2) = RIGHT(2) for a continuous function $f(x)$, then we know

$$\text{LEFT}(2) = \int_0^1 f(x)dx = \text{RIGHT}(2).$$

True [False]

Solution:

f. [2 points] Let $f(x) > 0$ be a continuous function. Then $F(x) = \int_0^x f(t)dt \geq 0$ for all values of x.

True [False]

Solution: