

1. (2 points each) Circle “True” or “False” for each of the following problems. Circle “True” only if the statement is *always* true. No explanation is necessary.

- (a) Suppose that a differentiable function h and its derivative, h' , are continuous. If $h'(x) < 0$ for all $a \leq x \leq b$ then every left-hand sum estimate of $\int_a^b h(x)dx$ will be an overestimate.

True False

- (b) For $f(x)$ a continuous function, $\int_{-1}^1 f(x)dx = 2 \int_0^1 f(x)dx$.

True False

- (c) If $\int_0^3 f(x)dx = 5$, then $\int_0^3 3f(x)dx = 15$.

True False

- (d) If $Z(t)$ is an anti-derivative for $z(t)$, then $Z(t + 5)$ is also an anti-derivative for $z(t)$.

True False

2. (3 points each) Explain in words what the following represent:

- (a) $\int_2^6 f(t)dt$ where $f(t)$ is the rate at which people are lining up outside of Target waiting for the store to open at 6 am, where t is in hours after midnight on the day after Thanksgiving,

- (b) $\int_0^4 a(t)dt$ where $a(t)$ is acceleration of an object in ft/sec² and t is in seconds

- (c) $\frac{1}{4} \int_5^9 r(t)dt$ where $r(t)$ is rainfall in inches per hour and t is in hours since noon