

CALCULUS I – Worksheet #55

If $\int_0^1 (1 - e^{-x}) dx$ is approximated using Riemann sums and the same number of subdivisions, and if L, R, M, and T denote respectively Left, Right, Midpoint, and Trapezoid sums, then it follows that:

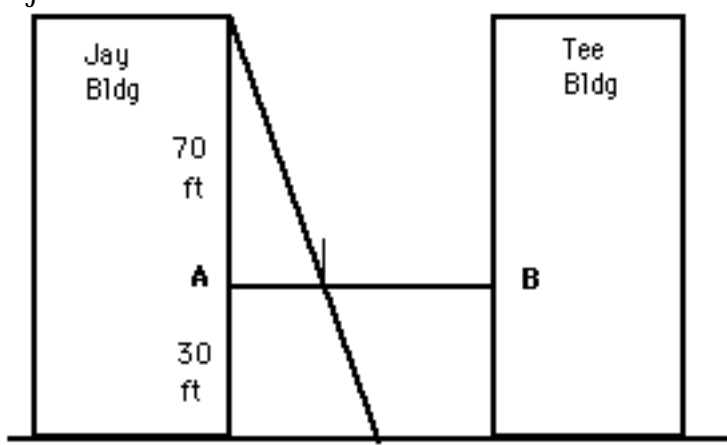
- A) $L \leq R \leq M \leq T$ B) $L \leq T \leq M \leq R$ C) $L \geq R \geq M \geq T$ D) $L \leq M \leq T \leq R$ E) none of these

AND DO THE FOLLOWING FREE RESPONSE QUESTIONS: 1991 Free Response (5,6)

5. Let f be a function that is even and continuous interval $[-3,3]$. The function f and its derivatives have the properties indicated in the table below.

X	0	$0 < x < 1$	1	$1 < x < 2$	2	$2 < x < 3$
$f(x)$	1	Positive	0	Negative	-1	Negative
$f'(x)$	Undefined	Negative	0	Negative	Undefined	Positive
$f''(x)$	Undefined	Positive	0	Negative	Undefined	Negative

- Find the x-coordinates of each point at which f attains an absolute maximum value or an absolute minimum value. For each x-coordinate you give, state whether f attains an absolute maximum or an absolute minimum.
- Find the x-coordinate of each point of inflection on the graph of f . Justify your answer.
- In the xy-plane sketch the graph of a function with all the given characteristics of f .



- A tightrope is stretched 30 ft. above the ground between the Jay and the Tee buildings, which are 50 ft. apart. A tightrope walker, walking at a constant rate of 2 feet per second from point A to point B, is illuminated by spotlight 70 ft. above point A, as shown in the diagram.
 - How fast is the shadow of the tightrope walker's feet moving along the ground when she is midway between the buildings? (Indicate units of measure)
 - How far from point A is the tightrope walker when the shadow of her feet reaches the base of the Tee building? (Indicate units of measure)
 - How fast is the shadow of the tightrope walker's feet moving up the wall of the Tee building when she is 10 ft. from point B? (Indicate units of measure)