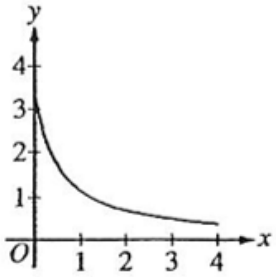
DATE: _____

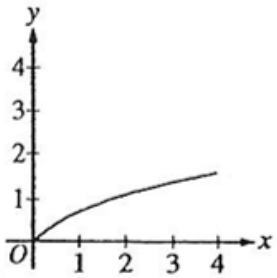
AP M/C & FRQ Trapezoidal Approximation Questions

1. If a trapezoidal sum overapproximates $\int_0^4 f(x)\,dx$, and a right Riemann sum underapproximates $\int_0^4 f(x)\,dx$, which of the following could be the graph of $y = f(x)$?

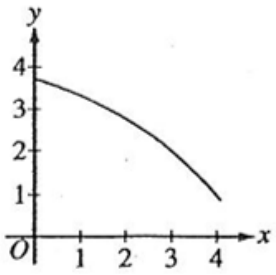
(A)



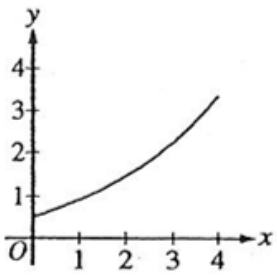
(B)



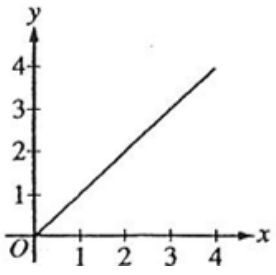
(C)



(D)



(E)



2.

x	$f(x)$	$f'(x)$
0	49	0
1	2	–8
2	–1	–80

The table above gives selected values for a differentiable and decreasing function f and its derivative. Which of the following is true?

I. A trapezoidal sum overapproximates $\int_0^2 f(x)\,dx$

II. A left Riemann sum underapproximates $\int_0^2 f(x)dx$

(A) I only **(B)** II only **(C)** I and II are both true **(D)** Neither I nor II are true

3.

Distance x (cm)	0	1	5	6	8
Temperature $T(x)$ (°C)	100	93	70	62	55

A metal wire of length 8 centimeters (cm) is heated at one end. The table above gives selected values of the temperature $T(x)$, in degrees Celsius (°C), of the wire x cm from the heated end. The function T is decreasing and twice differentiable.

Write an integral expression in terms of $T(x)$ for the average temperature of the wire. Estimate the average temperature of the wire using a trapezoidal sum with the four subintervals indicated by the data in the table. Indicate units of measure.