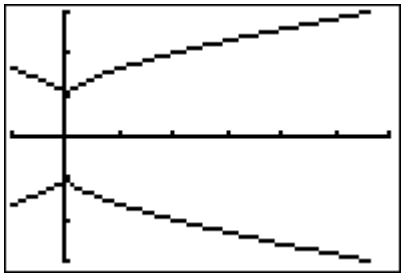
Chapter 6 Calculus Practice Exam

1. Consider the region enclosed between the graph of $f(x) = x^2 - \ln x$ and the x-axis for $1 \le x \le 5$.

a) Find the $MRAM_4$, and the area estimate obtained using the 4 midpoint rectangles. 1a) _____

b) Use fnint to find the area. 1b) _____

2. A solid is formed by revolving the curve $y = x^{\frac{2}{3}} + 1,\ \ 0 \le x \le 2.5$ about the x-axis. **Estimate the volume of the solid** by partitioning [0, 2.5] into five subintervals of equal length, slicing the solid with planes perpendicular to the x-axis at the subintervals' left endpoints, and constructing cylinders of height 0.5 based on cross sections at these points, as shown at the right.



2._____

3. Use an area to evaluate $\int_a^{a^2} (3x)dx,\ \ where\ a > 1$. 3._____

4. Use fnint to evaluate $\int_3^{7.2} \frac{e^x - \sin(x)}{x} dx$.

4._____

5. Suppose that f and g are continuous functions and that

$\int_3^5 f(x)dx = 7,\ \int_3^5 g(x)dx = 2,\ and\ \int_0^5 g(x)dx = 4$

Which of the following must be true?

I. $\int_0^3 g(x)dx = 2$

II. $\int_3^5 f(x)g(x)dx = 14$

III. $\int_3^5 [f(x) - g(x)]dx = 5$

A. I and II B. I and III C. II and III
D. III only E. I, II, and III

5._____

6. Evaluate $\int_2^7 (4x - 10)\, dx$.

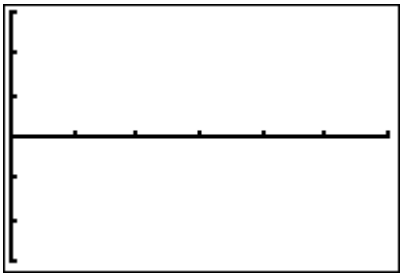
6._____

7. Evaluate $\int_0^{\frac{\pi}{3}} \sec(x)\tan(x)\ \ dx$ using Part 2 of the Fundamental Theorem of Calculus.

7._____

8. (a) Graph the function $y = 0.2x^2 - 0.8x - 1$ over the interval [0, 6].
(b) Integrate $y = 0.2x^2 - 0.8x - 1$ over [0, 6].
(c) Find the area of the region between the graph in part (a) and the x-axis

8a.



[0, 6] by [-3, 3]

8b._____

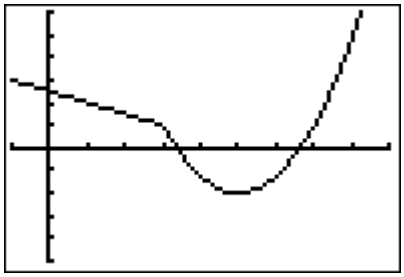
8c._____

9. Let f(x) = 4 – 3x.

a)Find $\frac{d}{dx}\int_{-1}^{3x^2} f(t)dt$ 9a._____

b) Find $\frac{d}{dx}\int_{-1}^{x} f(t)\,dt$ 9b._____

10. A particle moves along a coordinate axis. Its position at time t (sec) is $s(t) = \int_0^t f(x)dx\ cm,$ where f (x) is the function whose graph is shown.



a) What is the particle's position at t = 0? 10a._____

b) What is the particle's position at t = 3? 10b._____

c) What is the particle's velocity at t = 5? 10c._____

d) Approximately when is the acceleration zero? 10d._____

e) At what time during the first 7 sec does s have its largest value? 10e._____

11. Use the Trapezoidal Rule with n = 4 to approximate the value of $\int_0^2 (x^2 - x)\ dx$. 11._____

12. The function f is continuous on the closed interval [1, 7] and has the values that are given in the table below.
Use the subintervals [1, 4], [4,6], and [6, 7], what is the trapezoidal approximation of $\int_1^7 f(x)dx$?

x	1	4	6	7
f(x)	10	30	40	20

12. _____