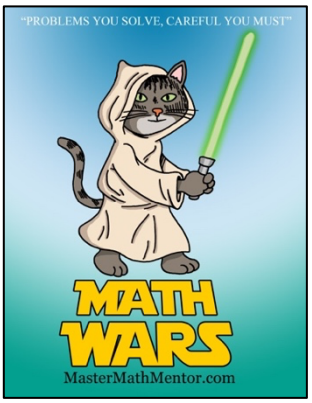
Math Wars – AB Calculus
Scrambled 174 – Integrals and Applications



Maximum Time: 7.75 Minutes

Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url: https://mastermathmentor.com/mmm/mathwars.ashx?key=174

When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing Submit for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based on how many problems you got right and your time. A perfect score is all problems correct using half the maximum time or less. You can text or email your friends with your results.

1. (1 pt) Which of the following statements are true?

I. $R(b) = R(a) + \int_a^b R'(t)\,dt$ II. $\frac{d}{dx}\int_a^{x^2} f(t)\,dt = f(x^2)$

A. I only B. II only C. I and II D. Neither

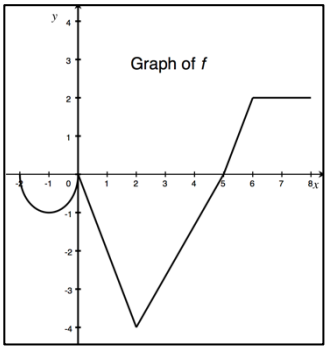
2. (3 pts) $\int \frac{1}{\cos^2 x \cdot e^{\tan x}}\,dx =$

A. $\frac{1}{e^{\tan x}} + C$ B. $\frac{-1}{e^{\tan x}} + C$ C. $\frac{-1}{\cos x \cdot e^{\tan x}} + C$ D. $\frac{1}{\sin x \cdot e^{\tan x}} + C$

3. (5 pts) A particle moves along the x-axis with acceleration $a(t) = -\left(\frac{12\ln t}{t} + 1\right)$. If the particle has velocity 10 at $t = 1$, describe the motion of the particle at $t = e$.

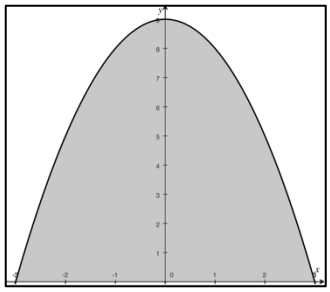
A. moving right, slowing down
B. moving right, speeding up
C. moving left, slowing down
D. moving left, speeding up

4. (7 pts) The graph of the function f, made up of a semi-circle and straight lines, is shown in the figure to the right. If $F(x) = \int_{-2}^{x} f(t)\,dt$, find the value of $F(7) + F'(7) + F''(7)$.



A. $-7 - \pi$ B. $-5 - \pi$
C. $-7 - \frac{\pi}{2}$ D. $-5 - \frac{\pi}{2}$

5. (9 pts) The shaded region formed by a parabola in the figure to the right is the base of a solid. The cross section of the solid at any value x units from the origin is a semi-circle. Find the expression representing the volume of the solid.



A. $\pi \int_0^3 x\left(9-x^2\right)^2 dx$

B. $\frac{\pi}{2} \int_0^3 \left(9-x^2\right)^2 dx$

C. $\frac{\pi}{4} \int_0^3 \left(9-x^2\right)^2 dx$

D. $\frac{\pi}{8} \int_0^3 \left(9-x^2\right)^2 dx$