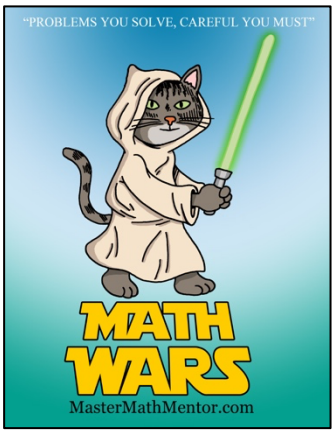
Math Wars – AB Calculus
Scrambled 177 – Integrals and Applications



Maximum Time: 8 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=177

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.

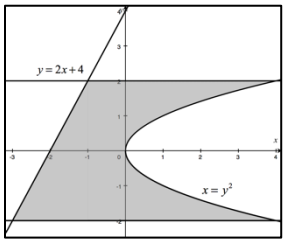
1. (1 pt) Choose the differential equation that models exponential growth.

A. The rate of change of y with respect to t *is* inversely proportional to t.
B. The rate of change of y with respect to t *is* directly proportional to t
C. The rate of change of y with respect to t is inversely proportional to y.
D. The rate of change of y with respect to t is directly proportional to y.

2. (3 pts) $\int (4+1/t)^4 (4/t^2)\,dt =$

A. $\frac{(4+1/t)^5}{5}+C$ B. $\frac{(4+1/t)^5}{20}+C$ C. $\frac{-(4+1/t)^5}{20}+C$ D. $\frac{-4(4+1/t)^5}{5}+C$

3. (5 pts) Which of the following gives the area of the shaded region?



I. $\int_{-2}^{2}\left[y^2-\frac{y-4}{2}\right]dy$ II. $\int_{-2}^{2}\left[x^2-\frac{x-4}{2}\right]dx$

III. $\int_{0}^{4}\left[2x+4-\sqrt{x}\right]dx+\int_{-3}^{0}\left[2x+4-(-2)\right]dx$

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

4. (7 pts) $\int \frac{\sin\sqrt{16x}}{\sqrt{4x}}\,dx =$

A. $-\cos\sqrt{x}+C$ B. $-\cos\frac{1}{2}\sqrt{x}+C$ C. $\frac{1}{2}\cos\sqrt{16x}+C$ D. $-\frac{1}{4}\cos\sqrt{16x}+C$

5. (9 pts) A particle's traveling along a straight line has acceleration $a(t) = 2\sec t \tan t$. If $v(0) = -2$, which of the following represents the distance that the particle travels on the interval $[0, \pi/2]$?

A. $\left| \int_0^{\pi/2} (2\sec t - 4)\, dt \right|$

B. $\int_0^{\pi/3} (2\sec t - 4)\, dt - \int_{\pi/3}^{\pi/2} (2\sec t - 4)\, dt$

C. $\int_0^{\pi/2} |2\sec t - 2|\, dt$

D. $-\int_0^{\pi/3} (2\sec t - 4)\, dt + \int_{\pi/3}^{\pi/2} (2\sec t - 4)\, dt$