

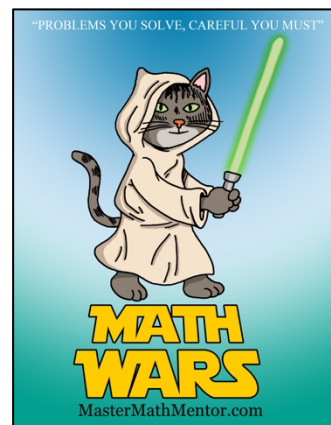
Math Wars – AB Calculus

Scrambled 185 – Integrals and Applications



Maximum Time: 7.5 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=185>



When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing 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) $\int \left(\frac{1}{3\cos^2 x} - \frac{3\tan x}{\cos x} \right) dx =$

A. $\frac{1}{3}\tan x - 3\sec x + C$

B. $\frac{1}{3}\tan x + 3\csc x + C$

C. $-\frac{1}{3\cos x} - 3\sec x + C$

D. $-\frac{1}{3\cos x} + 3\csc x + C$

2. (3 pts) In a small city, 250,000 people have been vaccinated against COVID and this number is increasing continuously at the rate of 2.5% a week. Write a differential equation that describes this situation.

A. $\frac{dV}{dt} = 0.025V$

B. $\frac{dV}{dt} = 250000 + 0.025V$

C. $\frac{dV}{dt} = 250000 + 0.025t$

D. $\frac{dV}{dt} = 250000 - 0.975V$

3. (5 pts) Let R be the region bounded by the graphs of $y = |4x|$ and the line $y = 3$. R is the base of a solid with cross sections perpendicular to the y -axis as squares. Find the volume of the solid

A. $\frac{9}{2}$

B. $\frac{9}{16}$

C. $\frac{9}{4}$

D. $\frac{9}{8}$

4. (7 pts) Solve the differential equation $\frac{dy}{dx} = (4x^3 - 1)(y^2 + 4)$ passing through the point $(-1, 0)$.

A. $y = 2 \tan(2x^4 - 2x - 4)$

B. $y = \tan(2x^4 - 2x - 4)$

C. $y = 2 \tan(x^4 - x - 2)$

D. $y = 2 \tan(x^4 - x)$

5. (9 pts) If $\int_{-6}^6 f(x) dx = 6$, then $\int_{-3}^3 [f(2x) - 1] dx =$

A. -3

B. 0

C. 3

D. 9