

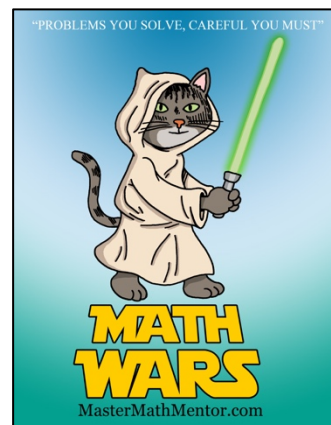
Math Wars – AB Calculus

Scrambled 184 – 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=184>



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) $\int \frac{1}{2x-3} dx =$

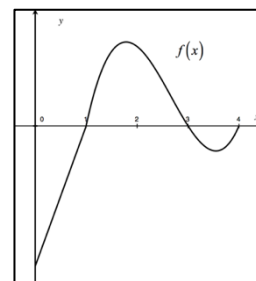
A. $\frac{\ln|2x-3|}{2} + C$

B. $2 \ln|2x-3| + C$

C. $\frac{1}{(2x-3)^2} + C$

D. $\frac{1}{2(2x-3)^2} + C$

2. (3 pts) The graph of the function f is shown to the right. Let g be the continuous function defined by $g(x) = \int_0^x f(t) dt$. For what value of x does g have a relative maximum?



A. $x = 0$

B. $x = 1$

C. $x = 2$

D. $x = 3$

3. (5 pts) If $f(x) = \sin^{-1}\left(\frac{1}{2}x\right)$, find $f'\left(\frac{1}{2}\right)$

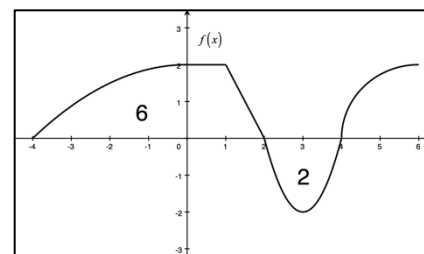
A. $\frac{2}{\sqrt{3}}$

B. $\frac{4}{\sqrt{3}}$

C. $\frac{2}{\sqrt{15}}$

D. $\frac{4}{\sqrt{15}}$

4. (7 pts) The graph of $f(x)$ made up of 2 straight lines, 2 parabolas, and a quarter-circle is shown in the figure to the right as well as selected areas between $f(x)$ and the x -axis. Find the value of $\int_{-4}^6 [f(x)+1] dx$.



A. $6 + \pi$
C. $17 + \pi$

B. $8 + \pi$
D. $8 + 2\pi$

5. (9 pts) One of the following integrals cannot be calculated by analytic means. What is its value?

$$\text{I. } \int_0^1 \left(\frac{2x}{x+2} \right) dx \quad \text{II. } \int_0^{\pi/4} \tan x dx \quad \text{III. } \int_0^{\pi} (\sin^2 x)(\cos^2 x) dx \quad \text{IV. } \int_0^1 e^{-2t} \sqrt{2 - e^{-2t}} dt$$

A. 0.613

B. 0.347

C. 0.393

D. 0.515