

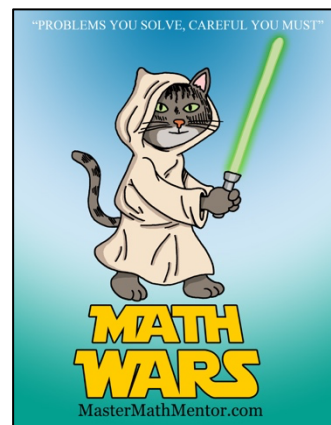
Math Wars – AB Calculus

Scrambled 176 – Integrals and Applications

Maximum Time: 8.25 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=176>



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.

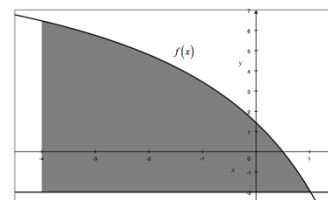
1. (1 pt) What expression defines the shaded area in the figure to the right?

A. $\int_{-4}^1 f(x) dx + 2$

B. $\int_{-4}^1 (f(x) + 2) dx$

C. $\int_{-4}^1 (f(x) - 2) dx$

D. $\int_1^{-4} (2 - f(x)) dx$



2. (3 pts) Find $\int_0^{\ln 3} e^{-x} dx$

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $e^3 - 1$

D. $1 - \frac{1}{e^3}$

3. On a cruise ship, many people order room-service for breakfast. The rate that they call in for room-service is $R(t)$ and is shown by the table below at various times of the morning with t measured in minutes and $R(t)$ is given in people per hour. Find the approximate average number of people who called for room service over a 90-minute period as calculated by a trapezoidal rule using $\Delta t = 15$ minutes.

time	7:30	7:45	8:00	8:15	8:30	8:45	9:00
$R(t)$ (people per hour)	72	125	160	145	104	80	45

A. 81

B. 112

C. 131

D. 448

4. (7 pts) $\int \frac{x}{\sqrt{x-10}} dx =$

A. $\frac{2}{5}(x-10)^{5/2} + \frac{20}{3}(x-10)^{3/2} + C$

B. $\frac{2}{3}(x-10)^{3/2} + 20(x-10)^{1/2} + C$

C. $\frac{2(x^2 + 10x)}{3(x-10)^{3/2}} + C$

D. $\frac{3(x^2 + 10x)}{2(x-10)^{3/2}} + C$

5. (9 pts) Using the fact that $\sin^2 x + \cos^2 x = 1$, if $F(x) = \int \cos^3 x \, dx$ and $F(0) = 1$, find $F\left(\frac{\pi}{2}\right)$

A. $\frac{7}{3}$

B. $\frac{5}{3}$

C. $\frac{2}{3}$

D. $\frac{5}{4}$