

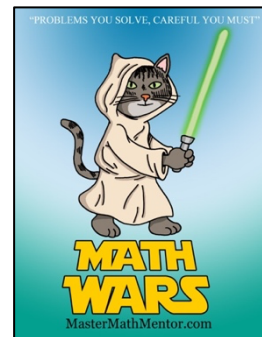
Math Wars – AB Calculus

Topic 133 – Area Under Curve



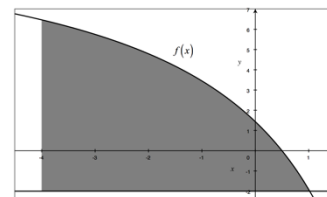
Maximum Time: 7.5 Minutes

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=133>



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

2. (3 pts) What is the area enclosed by the curves $y = e - 1/x$, $y = 0$, $x = 1$, and $x = e$?

A. $e - 1$

B. $e - \frac{1}{e}$

C. $e^2 - e$

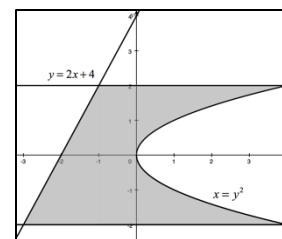
D. $e^2 - e - 1$

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. $\int_0^4 [2x + 4 - \sqrt{x}] dx + \int_{-3}^0 [2x + 4 - (-2)] dx$



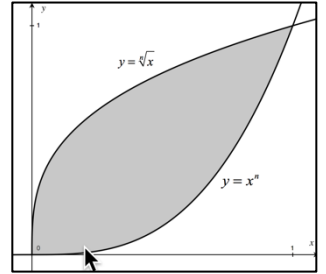
A. I only

B. I and II only

C. III only

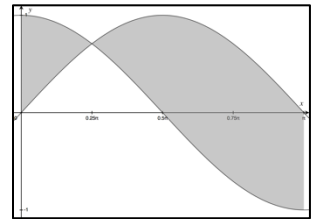
D. I, II and III

4. (7 pts) The figure on the right shows the curves $y = x^n$, $y = \sqrt[n]{x}$, $n > 1$. Find the area of the shaded region:



- A. 1
 B. $\frac{n}{n+1}$
 C. $\frac{n-1}{n+1}$
 D. $\frac{1}{n+1}$

5. (9 pts) $y = \sin x$ and $y = \cos x$ intersect at one point on $[0, \pi]$ as shown in the figure to the right, creating two distinct areas. Find the difference between these areas.



- A. 2
 B. $2 + \sqrt{2}$
 C. $2 - \sqrt{2}$
 D. $2\sqrt{2}$