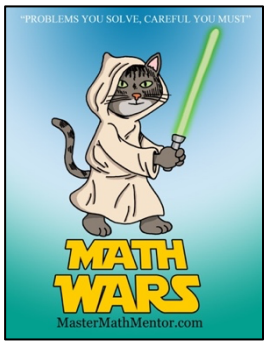
Math Wars – AB Calculus
Topic 134 – Volume

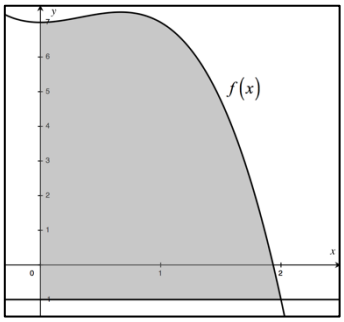


Maximum Time: 8.25 Minutes

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=134

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) The shaded region in the graph in the figure to the right is rotated about the line $y = -1$. Which of the following represents the volume?



A. $\pi\int_0^2\left[f(x)-1\right]^2dx$ B. $\pi\int_0^2\left[f(x)+1\right]^2dx$

C. $\pi\int_0^2\left(\left[f(x)\right]^2+1\right)dx$ D. $\pi\int_0^2\left(\left[f(x)\right]^2-1\right)dx$

2. (3 pts) The region between the y-axis and the curves $y=2$ and $y=\sqrt{x}$ is rotated about the x-axis. Find the volume of the solid generated.

A. 8π B. 4π C. $\frac{64\pi}{3}$ D. $\frac{56\pi}{3}$

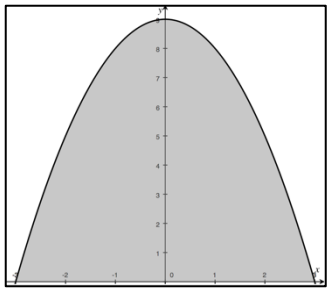
3. (5 pts) Let R be the region bounded by the graphs of $y=|4x|$ and the line $y=3$. R is the base of a solid with cross sections perpendicular to the y-axis as squares. Find the volume of the solid

A. $\frac{9}{2}$ B. $\frac{9}{16}$ C. $\frac{9}{4}$ D. $\frac{9}{8}$

4. (7 pts) Region R is bounded by the graphs of $y=\sqrt{4x}, y=0,$ and $x=6$. If R is rotated about the x-axis, find the value of k such that in the interval [0, 6] such that the line $x = k$ divides the solid into two equal volumes.

A. 3 B. $3\sqrt{2}$ C. 3.5 D. $2\sqrt{2}$

5. (9 pts) The shaded region formed by a parabola in the figure to the right is the base of a solid. The cross section of the solid at any value x units from the origin is a semi-circle. Find the expression representing the volume of the solid.



A. $\pi \int_0^3 x\left(9-x^2\right)^2 dx$

B. $\frac{\pi}{2} \int_0^3 \left(9-x^2\right)^2 dx$

C. $\frac{\pi}{4} \int_0^3 \left(9-x^2\right)^2 dx$

D. $\frac{\pi}{8} \int_0^3 \left(9-x^2\right)^2 dx$