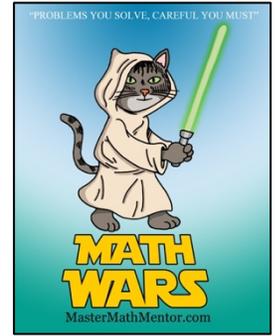


# Math Wars – AB Calculus

## Topic 131 – Average Value



**Maximum Time: 8 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=131>

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) Which of the following statements are true?

- I. the average value of  $f'(x)$  on  $[a, b], b > a$  is the same as the average rate of change of  $f(x)$  on  $[a, b]$ .
  - II. there must be some number  $c$  on  $[a, b], b > a$  such that the average value of  $f(x)$  on  $[a, c] = 0$ .
- A. I only                      B. II only                      C. I and II only                      D. Neither

2. (3 pts) The average value of the function  $f(x) = x^3 - x - 1$  on the interval  $[-2, 4]$  is

- A. 0                      B. 8                      C.  $\frac{28}{3}$                       D. 24

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

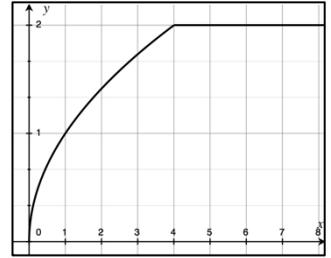
- A. 81                      B. 112                      C. 131                      D. 448

4. (7 pts) If a particle moves along a straight line with velocity  $v(t) = 2t^2 \cos t$ , find the average acceleration of the particle from  $t = \pi$  to  $t = 2\pi$ .

- A. 0                      B.  $4\pi$                       C.  $6\pi$                       D.  $10\pi$

5. (9 pts) The differentiable function  $f(x)$  is comprised of two pieces.

$f(x) = \sqrt{x}$  for  $0 \leq x \leq 4$  and the function is constant for  $4 < x \leq 8$ , as shown by the figure to the right. For what interval,  $0 \leq x \leq 8$ , does the function satisfy the mean value theorem for integrals?



- A. (1, 2)
- C. (3, 4)

- B. (2, 3)
- D. (4, 5)