

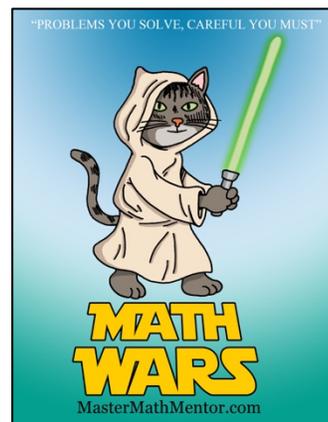
# Math Wars – AB Calculus

## Scrambled 167 – Limits & Derivatives



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=167>



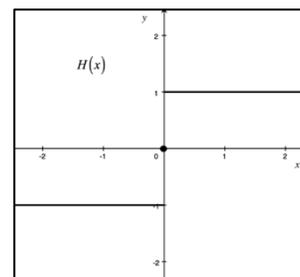
When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing  for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based on how many 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) A car rental company charges its customers the same amount for any car. It charges  $d$  dollars a day where  $60 \leq d \leq 150$ . The number of cars rented per day can be modeled by  $n(d) = 850 - 5d$ . How much should the company charge each customer to maximize revenue?

- A. \$60                      B. \$85                      C. \$135                      D. \$150

2. (3 pts) If  $H(x)$  is given by the graph to the right, find  $\lim_{x \rightarrow 0^+} H(x) - \lim_{x \rightarrow 0^-} H(x)$

- A. 1                              B. 0  
C. 2                              D. does not exist



3. (5 pts) For which of these functions  $f(x)$  is  $f'(0) \neq 0$  ?

- A.  $f(x) = \cos x^2$               B.  $f(x) = \cos^2 x$               C.  $f(x) = x \cos x$               D.  $f(x) = \sqrt{\cos x}$

4. (7 pts) A bowling ball is dropped from a 200 ft tower onto a piece of bulletproof glass to see if the glass will shatter. How fast in mph is the bowling ball moving at impact?

- A. 38.57 mph                      B. 56.57 mph                      C. 77.14 mph                      D. 113.14 mph

5. (9 pts) A particle moves along the  $x$ -axis such that its position is given by  $x(t) = 2\sin(\pi t) - \pi t$  for  $0 \leq t \leq 1$ . The graph of its velocity is shown on the figure to the right. Find the maximum distance the particle gets from its starting position.

- A.  $\frac{1}{3}$                               B.  $\sqrt{3} - \frac{\pi}{3}$                               C.  $\frac{\pi}{6} - 1$                               D.  $\pi$

