

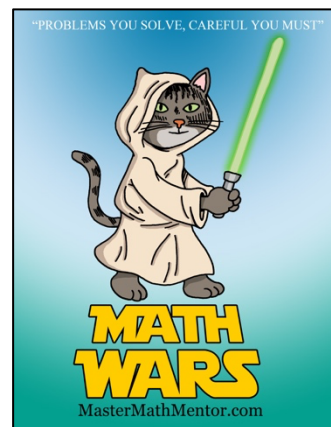
# Math Wars – AB Calculus

## Scrambled 161 – Limits & Derivatives



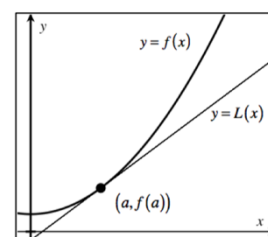
Maximum Time: 8 Minutes

**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=161>

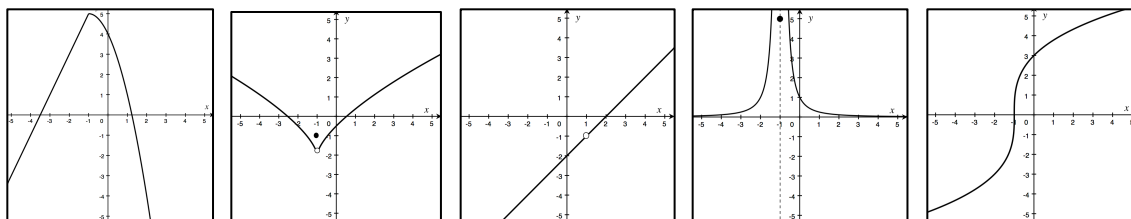


When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing **Submit** for each problem when you are sure of your answer. When complete, stop the timer. You will see problems you got correct in green and incorrect in red. You will receive a score based 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) Suppose the line  $y = L(x)$  is tangent to the curve  $y = f(x)$  at  $x = a$  as shown in the figure to the right. The equation for  $L(x)$  is



- A.  $L(x) = f(a) + f'(a)x$                       B.  $L(x) = f(a) + f'(a)(x - a)$   
 C.  $L(x) = f'(a)(x - a) - f(a)$               D.  $L(x) = f'(a)x - f(a)$
2. (3 pts) How many horizontal tangents are there to the curve  $f(x) = x^6 - 3x^2$ ?
- A. 6                      B. 5                      C. 3                      D. 1
3. (5 pts) Below there are graphs of 5 functions. Assign 2 points if the function is differentiable at  $x = -1$ , 1 point if the function is continuous only at  $x = -1$ , and no points for any other situation. Total the points.



- A. 2                      B. 3                      C. 4                      D. 5
4. (7 pts) A manufacturer can produce 2 gigabyte flash drives at a cost of \$2 apiece. The drives sell for \$5 apiece on a particular website, and at this price, consumers on this site have been buying 4,000 drives a month. The manufacturer is planning to raise the price of the drives and estimates that for each \$1 increase in the price, 400 fewer drives will be sold each month. If they maximize their revenue, what is their profit?
- A. \$6,000                      B. \$7,500                      C. \$9,000                      D. 15,000

5. (9 pts) Find the equation to the tangent line to  $y = \ln\left(\frac{2e^{2x} - 1}{3e^{3x} - 2}\right)$  at  $x = 0$

A.  $y = 5 - 5x$

B.  $y = -5x$

C.  $y = 1 - x$

D.  $y = -x$