

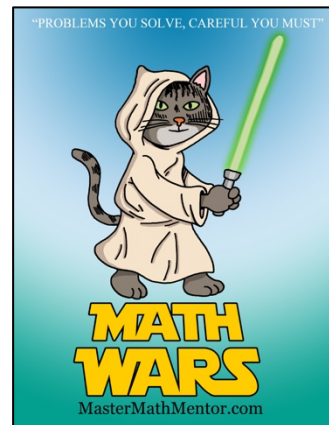
# Math Wars – AB Calculus

## Scrambled 168 – Limits & Derivatives



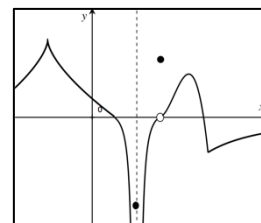
Maximum Time: 8 Minutes

**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=168>



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 graph of  $y = f(x)$  is shown in the figure to the right. Which describes the number of relative extrema and whether or not the function has absolute extrema?



	A.	B.	C.	D.
Stationary Pt.	1	1	2	1
Relative Minima	1	0	1	0
Relative Maxima	2	1	2	1
Absolute Minimum	no	no	yes	no
Absolute Maximum	yes	yes	no	no

2. (3 pts)  $f(x) = 3 \tan^3 3x, f'(x) =$

A.  $3 \tan^2(3x)$       B.  $27 \tan^2(3x) \sec^2(3x)$       C.  $9 \tan^2(3x) \sec^2(3x)$       D.  $27 \tan(3x) \sec(3x)$

3. (5 pts) Find all integer values of  $x$  where the line tangent to  $y = \frac{x+4}{x^2-9}$  is horizontal.

I.  $x = -1, x = -9$

II.  $x = -3, x = 3$

A. I only      B. II only      C. I and II only      D. None

4. (7 pts) If  $f'(x) = e^{2x}(x^2 - 2x - 11)$ , for what value of  $x$  is  $f$  increasing and an inflection point?

A.  $x = -3$  only      B.  $x = -4$  only      C.  $x = -3$  and  $x = -4$       D. no value

5. (9 pts) Find  $\lim_{x \rightarrow \infty} \frac{4xe^x + 2x + 4}{2xe^x + 4x + 2}$

A. 2      B.  $\frac{1}{2}$       C. 1      D. 0