

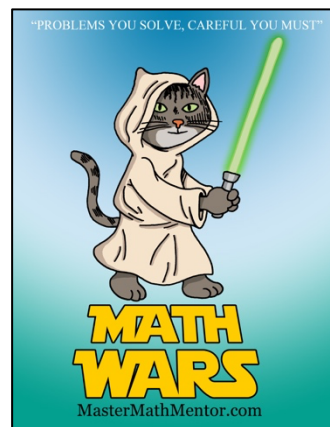
Math Wars – AB Calculus

Scrambled 164 – Limits & Derivatives



Maximum Time: 8.5 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=164>



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 pt) If a is a constant and $f(x) = (4x^2 - 6x - 3)^3$, $f'(x) =$
 - $6(4x^2 - 6x - 3)(4x - 3)$
 - $6(4x^2 - 6x - 3)^2(4x - 3)$
 - $3(4x^2 - 6x - 3)^2$
 - $3(8x - 6)^3$
- (3 pts) Let $f(x)$ be a function such that $\frac{dy}{dx} = 4x^2 - 2e^{2y} + 7x$. If $f(x)$ passes through the point $(-2, 0)$, characterize the point $(-2, 0)$.
 - relative maximum
 - relative minimum
 - inflection point
 - none of these
- (5 pts) Within the domain of the functions below, how many of the following have a different derivative than that of $y = \ln x$?
 - $y = \ln(4x)$
 - $y = -\ln\left(\frac{1}{x}\right)$
 - $y = 2\ln(\sqrt{x})$
 - 0
 - 1
 - 2
 - 3
- (7 pts) The graph of $x^3 + y^3 - 9xy = a$, where a is a non-negative constant, is a folium (its first quadrant shape is that of a leaf). Depending on the value of a , the graph passes through the following points. Which is the only one that is the location of a vertical tangent line?
 - $(6, 12)$
 - $(5, 4)$
 - $(3, \pi)$
 - $\left(\frac{2}{3}, \sqrt{2}\right)$
- (9 pts) Suppose $f(x)$ is differentiable at all values of x and $f(-a) = 5$ and $f'(x) \leq -2$ for all values of x . Using the Mean-Value Theorem, what is the largest possible value of $f(a)$?
 - $5 - 4a$
 - $5 - 2a$
 - $10 - a$
 - $-10 - 2a$