

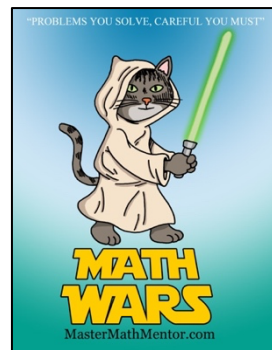
Math Wars – AB Calculus

Topic 107 – Implicit Differentiation



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=107>



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) If $x^2 - y^2 = 4$, which of the following statements are true?

- I. the graph has a horizontal tangent at $(0, 2)$
- II. The graph has a vertical tangent at $(2, 0)$

- A. I only B. II only C. Both I and II D. Neither I nor II

2. (3 pts) For how many of the following curves can $\frac{dy}{dx}$ not easily be found explicitly?

- I. $xy - y = 5$
- II. $x + \sqrt{xy} = 4$
- III. $y + \cos y = x$
- IV. $x^2 - y^2 = x + 1$

- A. 1 B. 2 C. 3 D. 4

3. (5 pts) Find the slope to the curve $xy^2 + x^2y = 8x$ at $(-2, 4)$.

- A. $-\frac{1}{4}$ B. $-\frac{2}{3}$ C. $\frac{2}{5}$ D. 2

4. (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?

- A. $(6, 12)$ B. $(5, 4)$ C. $(3, \pi)$ D. $\left(\frac{2}{3}, \sqrt{2}\right)$

5. (9 pts) If $x^2 + 2y^2 = 24$, find $\frac{d^2y}{dx^2}$ at $(-4, -2)$

- A. -1 B. $-\frac{1}{4}$ C. $\frac{3}{4}$ D. $\frac{1}{2}$