

Math Wars – AB Calculus

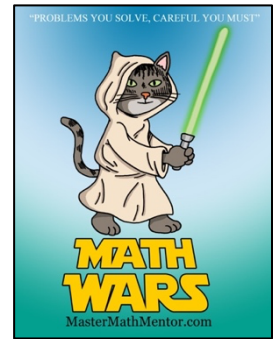
Topic 136 – Slope Fields & Differential Equations



Maximum Time: 7.5 Minutes

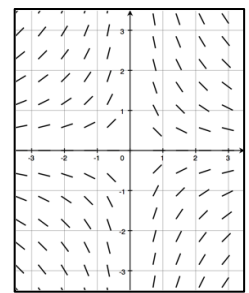
Directions: To start, you need to download the Math Wars application on your cell phone: Use the QR code or the url:

<https://mastermathmentor.com/mmm/mathwars.ashx?key=136>



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 slope field to the right could be which of the following?



- A. $\frac{dy}{dx} = \frac{x}{y}$ B. $\frac{dy}{dx} = \frac{y}{x}$
 C. $\frac{dy}{dx} = \frac{-y}{x}$ D. $\frac{dy}{dx} = \frac{-x}{y}$

2. (3 pts) Which of the following differential equations are separable?

- I. $\frac{dy}{dx} = x^2 - 2xy + y^2$ II. $\frac{dy}{dx} = 2xy - 8x + 3y - 12$ III. $\frac{dy}{dx} = e^{x+y+1}$

- A. I and II only B. I and III only C. II and III only D. Only one of them

3. (5 pts) Solve the differential equation $\frac{dy}{dx} = 2xy^2$

- A. $y = C - \sqrt[3]{x^2}$ B. $y = \sqrt[3]{C - x^2}$ C. $y = \frac{-1}{x^2} + C$ D. $y = \frac{-1}{x^2 + C}$

4. (7 pts) Solve the differential equation $\frac{dy}{dx} = (4x^3 - 1)(y^2 + 4)$ passing through the point $(-1, 0)$.

- A. $y = 2 \tan(2x^4 - 2x - 4)$ B. $y = \tan(2x^4 - 2x - 4)$
 C. $y = 2 \tan(x^4 - x - 2)$ D. $y = 2 \tan(x^4 - x)$

5. (9 pts) Find the particular solution that satisfies the differential equation $dT + (T - 20)dt = 0$ with initial condition $T(0) = -20$.

- A. $T = -20e^{-t}$ B. $T = -20e^t$
 C. $T = 20 - 40e^{-t}$ D. $T = 20 - 40e^t$