

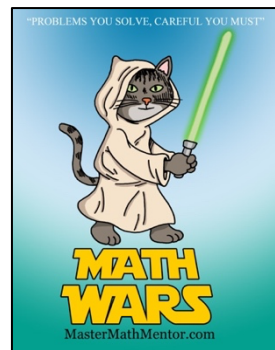
Math Wars – AB Calculus

Topic 111 – Continuity and Differentiability



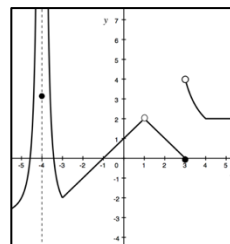
Maximum Time: 8.25 Minutes

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=111>



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. Text or email your friends with your results.

1. (1 pt) At how many locations does the function to the right fail continuity?



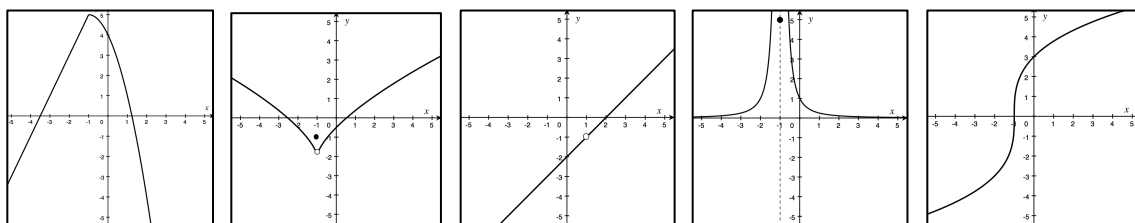
- A. 2
C. 4
- B. 3
D. 5

2. (3 pts) Determine how many features the function $f(x) = \frac{x^2 - 2x}{x^4 - 4x^2}$ has.

- I. a hole at $x = 0$ II. A hole at $x = 2$ III. A discontinuity at $x = -2$ IV. A discontinuity at $x = 2$

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

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) Which of the following describes the function? $f(x) = \begin{cases} \cos 2x - 2 \cos x + \sin 2x - 2 \sin x, & x \geq 0 \\ -x - e^{-x}, & x < 0 \end{cases}$

- A. Neither continuous nor differentiable
C. Differentiable but not continuous
- B. Continuous but not differentiable
D. Both continuous and differentiable

5. (9 pts) Let $f(x) = \begin{cases} 6e^{x-3} + c, & x \geq 3 \\ a(6-x)^2 + b, & x < 3 \end{cases}$. Suppose f is differentiable. Which statement must be true?

- A. A sufficient condition is that $b - c = 15$
C. It is possible that $b - c = 15$.
- B. A necessary condition is that $b - c = 15$
D. Even with knowing the value of a , no statement is possible about b and c .