

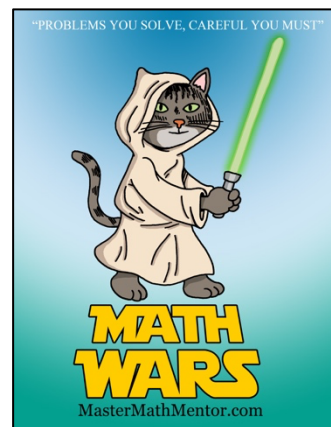
# Math Wars – BC Calculus

## Scrambled # 252



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=252>



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. (1 pt) Which of the following limits is an example of an indeterminate form?

I.  $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x^3 - 4x + 3}$

II.  $\lim_{x \rightarrow 2} \frac{x - 2}{\ln(x - 2)}$

III.  $\lim_{x \rightarrow -\infty} (e^x + 1)^{-x}$

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

2. (3 pts) Which of the following differential equations has a logistic growth curve as a solution?

A.  $\frac{dP}{dt} = \frac{1}{8}P^2 - \frac{1}{4}P$

B.  $\frac{dP}{dt} = \frac{1}{8}P - \frac{1}{4}P^2$

C.  $\frac{dP}{dt} = \frac{1}{4} - P$

D.  $\frac{dP}{dt} = \frac{1}{8}P - \frac{1}{4}P^3$

3. (5 pts) The ratio test is applied to series I and the root test is applied to series II. Which of them gives an inconclusive result?

I.  $\sum_{n=0}^{\infty} \frac{(-1)^n}{n^2 + n}$

II.  $\sum_{n=1}^{\infty} \left( \frac{3n+2}{3-2n} \right)^{2n}$

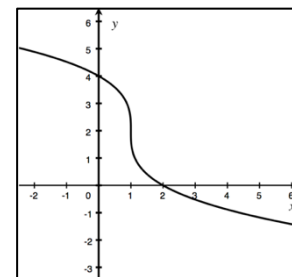
A. I only

B. II only

C. I and II

D. Neither

4. (7 pts) The path of an object moving along plane curve given by  $r(t) = \langle 1 - t^3, 2t + 2 \rangle$ ,  $-\infty < t < \infty$  is shown in the figure to the right. Which of the following statements are true?



- I. The object is always moving downwards.
- II. The acceleration of the object is constant.
- III. The speed of the object is steadily increasing.

A. I only

B. II only

C. III only

D. None of them

5. (9 pts) Which of the following series could possibly converge because of the  $n$ th term test?

I.  $\sqrt{\frac{1}{11}} + \sqrt{\frac{4}{14}} + \sqrt{\frac{9}{19}} + \sqrt{\frac{16}{22}} + \dots$     II.  $\frac{1}{3} + \frac{2}{9} + \frac{3}{27} + \frac{4}{81} + \dots$     III.  $e + \frac{\sqrt{e}}{2} + \frac{\sqrt[3]{e}}{3} + \frac{\sqrt[4]{e}}{4} + \frac{\sqrt[5]{e}}{5} + \dots$

A. I only

B. II only

C. III only

D. II and III only