

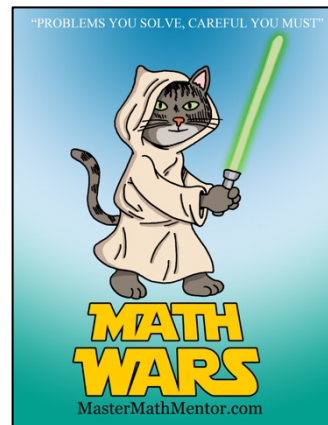
Math Wars – BC Calculus

Scrambled # 259



Maximum Time: 7.75 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=259>



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) Consider the series $\sum_{n=1}^{\infty} \frac{n^3}{3^n}$. If the ratio test is applied, which expression would have to be verified to show that the series converges.

A. $\lim_{n \rightarrow \infty} \frac{n^3}{3^n} < 1$

B. $\lim_{n \rightarrow \infty} \frac{n^3}{3^n} > 1$

C. $\lim_{n \rightarrow \infty} \frac{(n+1)^3}{3n^3} < 1$

D. $\lim_{n \rightarrow \infty} \frac{3n^3}{(n+1)^3} < 1$

2. (3 pts) Which of the following curves have the same arc length as $y = x^2$ on $[-2, 2]$?

I. $y = x^2 - 1$

II. $y = |x^2 - 1|$

III. $y = x^2 - 2x + 1$

A. I and II only

B. I and III only

C. II and III only

D. I, II, and III

3. (5 pts) The function f is defined by the power series $f(x) = 1 + (ax + b) + (ax + b)^2 + (ax + b)^3 + \dots$, $a, b \neq 0$ for all real numbers for which the series converges. What is the radius of convergence for f ?

A. a

B. b

C. $\frac{1}{a}$

D. $\frac{b}{a}$

4. (7 pts) Find $\lim_{x \rightarrow \infty} (x^{-2/3x})$

A. 0

B. $\frac{-2}{3}$

C. 1

D. ∞

5. (9 pts) A sequence is given by $a_n = \left\{ \frac{\ln 3}{\ln 3}, \frac{\ln 4}{\ln 5}, \frac{\ln 5}{\ln 7}, \frac{\ln 6}{\ln 9}, \dots \right\}$. To what number does this sequence converge?

A. 0

B. 1

C. $\frac{1}{2}$

D. it diverges