

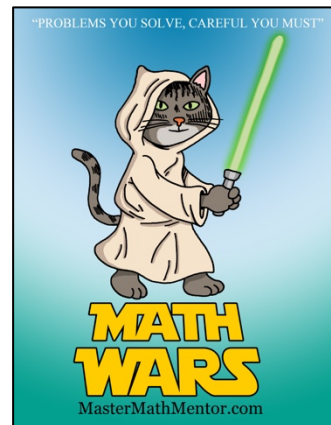
# Math Wars – BC Calculus

## Scrambled # 255



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=255>



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) How many the following integrals are convergent?

I.  $\int_2^{\infty} \frac{1}{x-1} dx$

II.  $\int_2^{\infty} \frac{1}{(x-1)^2} dx$

III.  $\int_2^{\infty} \frac{1}{\sqrt{x-1}} dx$

A. 3

B. 2

C. 1

D. 0

2. (3 pts) Let  $25+16(x+1)+9(x+1)^2+4(x+1)^3+1(x+1)^4+\dots$  be a Taylor series for the function  $f$  about  $x = -1$ . Which of the following have the same value?

A.  $f'(-1)$  and  $f''(-1)$     B.  $f''(-1)$  and  $f'''(-1)$     C.  $f'''(-1)$  and  $f^{(4)}(-1)$     D. all are different

3. (5 pts) Find the sum:  $\sum_{n=1}^{\infty} \frac{2}{n+1} - \frac{2}{n+3}$  if it exists

A.  $\frac{2}{3}$

B. 1

C.  $\frac{5}{3}$

D. Divergent

4. (7 pts) A population is modeled by a function  $P$  that satisfies the differential equation  $\frac{dP}{dt} = \frac{P}{e} \left( 10 - \frac{P}{4e} \right)$ . If  $P(0) = 2$ , at what value of  $P$  does inflection point occur?

A.  $20e^2$

B.  $5e^2$

C.  $20e$

D.  $40e$

5. (9 pts) Find a power series for  $\frac{8}{x+2}$ , centered at  $x = 0$ .

A.  $8 - 8x + 8x^2 - 8x^3 + \dots$

B.  $8 + 8x + 8x^2 + 8x^3 + \dots$

C.  $8 - 4x + 2x^2 - x^3 + \dots$

D.  $4 - 2x + x^2 - \frac{x^3}{2} + \dots$