

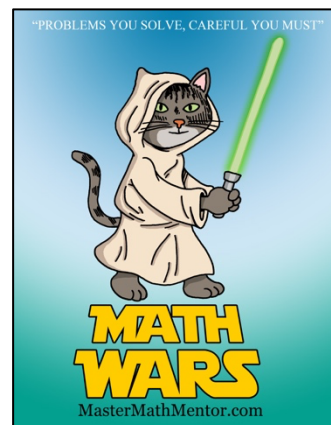
Math Wars – BC Calculus

Topic 221 – Manipulation of Series



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=221>



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) The Taylor series for $f(x)$ is given by $x - x^2 + \frac{x^3}{2!} - \frac{x^4}{3!} + \frac{x^5}{4!} - \frac{x^6}{5!} \dots$. Find $f(x)$ in terms of a familiar function.

A. $f(x) = x \cdot e^x$

B. $f(x) = x \cdot e^{-x}$

C. $f(x) = x \cdot e^x - 1$

D. $f(x) = -xe^x + 1$

2. (3 pts) Let $f(x) = \cos x^3$. Find $f^{(12)}(0)$.

A. $\frac{1}{4!}$

B. $\frac{12!}{4!}$

C. $\frac{1}{12!}$

D. $8!$

3. (5 pts) If $f(x) =$ the first four nonzero terms of the Maclaurin polynomial $\frac{e^x - 1}{x}$, find $f'(1)$

A. $\frac{47}{24}$

B. $\frac{41}{24}$

C. $\frac{23}{24}$

D. $\frac{7}{24}$

4. (7 pts) If $f(x) =$ the first three nonzero terms of the Taylor polynomial for $\frac{\tan^{-1}(x^2)}{x}$, centered at 0, find

$$\int_0^1 f(x) dx.$$

A. $\frac{13}{15}$

B. $\frac{23}{15}$

C. $\frac{209}{450}$

D. $\frac{259}{450}$

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