

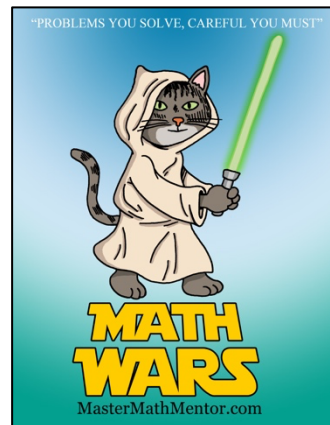
Math Wars – BC Calculus

Topic 220 – Taylor Series



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=220>



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) Find the 3rd degree Maclaurin polynomial for $f(x) = \cos x - \sin x$.

A. $1 + x - \frac{x^2}{2!} + \frac{x^3}{3!}$

B. $1 - x + \frac{x^2}{2!} - \frac{x^3}{3!}$

C. $1 + x - \frac{x^2}{2!} - \frac{x^3}{3!}$

D. $1 - x - \frac{x^2}{2!} + \frac{x^3}{3!}$

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) The fourth degree Taylor polynomial for $f(x) = e^x$ is used to approximate $e^1 - e^{-1}$. Find the error in using this approximation.

A. 0.333

B. 0.753

C. 1.419

D. 2.003

4. (7 pts) The value of $\tan^{-1} 1 - \sin 1$ is approximated by the 5th degree Taylor polynomial centered at 0. Find the fraction that represents this difference.

A. $\frac{43}{120}$

B. $\frac{23}{120}$

C. $\frac{1}{40}$

D. 0

5. (9 pts) Given $f(x) = \frac{1}{1+x}$. Find the difference between $f(0.5)$ and the 4th degree Taylor Polynomial centered at 0, approximation for $f(0.5)$.

A. 0.021

B. 0.042

C. 1.208

D. 1.271