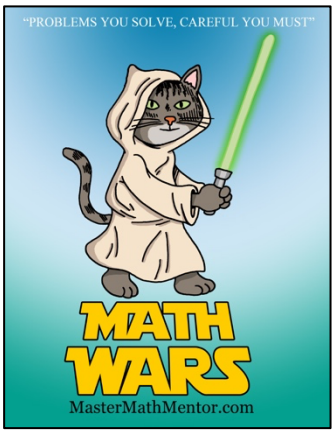
Math Wars – BC Calculus
Scrambled # 269



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=269

When ready, start the timer and then solve the problems below, entering your choice, A, B, C, D and pressing Submit 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 $x - x^2 + \frac{x^3}{2!} - \frac{x^4}{3!} + \frac{x^5}{4!} - \frac{x^6}{5!} \ldots$. 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) Which of the following series must diverge because of the *n*th term test?

I) $\sum_{n=1}^{\infty} 1.1^n$
II) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$
III. $\sum_{n=1}^{\infty} \tan\frac{(2n-1)\pi}{4}$

A. I only
B. I and II
C. I and III
D. II and III

3. (5 pts) Let f be a function having derivatives for all orders of real numbers. The first three derivatives of f at $x = 1$ are given in the table below. Use the third-degree Taylor polynomial at $x = 1$ to approximate $f(-1)$.

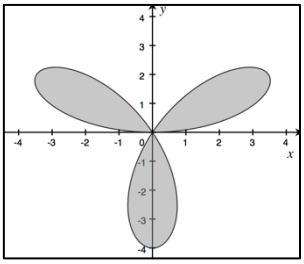
x	$f(x)$	$f'(x)$	$f''(x)$	$f'''(x)$
1	–6	–8	20	3

A. $\frac{23}{2}$
B. 46
C. 58
D. 66

4. (7 pts) $\int \tan^{-1} x \, dx =$

A. $x\tan^{-1} x - \frac{1}{2}\ln(1-x^2) + C$
B. $x\tan^{-1} x - 2\ln(1-x^2) + C$
C. $x\tan^{-1} x - \frac{1}{2}\ln(1+x^2) + C$
D. $x\tan^{-1} x - 2\ln(1+x^2) + C$

5. (9 pts) The graph of the three-leaf rose $r = 4\sin 3\theta$ is shown in the figure to the right. Which of the following gives the correct area of the figure?



I. $32\int_0^{2\pi/3} \sin^2 3\theta\, d\theta$ II. $8\int_0^{2\pi} \sin^2 3\theta\, d\theta$ III. $48\int_0^{\pi/3} \sin^2 3\theta\, d\theta$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III