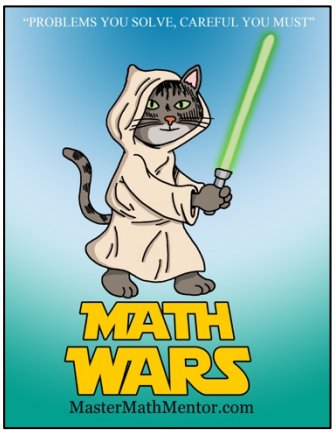
Math Wars – BC Calculus
Scrambled # 258



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 https://mastermathmentor.com/mmm/mathwars.ashx?key=258

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) Point $P(x,y)$ moves in the xy-plane in such a way that $x = e^{2t}$ and $y = \ln t$ for $t > 0$. Find the instantaneous rate of change of y with respect to x when $t = 1/2$.

A. e B. $2e$ C. $\frac{1}{e}$ D. $\frac{1}{4e}$

2. (3 pts) Using the ratio test to $\sum_{n=0}^{\infty} \frac{n!}{a^n}$ where $a > 0$, the result is

A. Must converge
B. Could converge depending on a
C. Must diverge
D. Inconclusive

3. (5 pts) $\int \frac{2x-12}{x^2+4x-12}\,dx =$

A. $\ln\left[|x-2|^3|x+6|\right]+C$ B. $\ln\left[\frac{|x-2|^3}{|x+6|}\right]+C$ C. $\ln\left[|x+6|^3|x-2|\right]+C$ D. $\ln\left[\frac{|x+6|^3}{|x-2|}\right]+C$

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) If $\mathbf{r}'(t) = \left\langle 8t, \frac{4}{1+t^2} \right\rangle$ and $\mathbf{r}(0) = \langle -1, \pi \rangle$, find $\mathbf{r}(1)$.

A. $\langle 4, \pi \rangle$ B. $\langle 4, -\pi \rangle$ C. $\langle 3, 2\pi \rangle$ D. $\langle 3, 0 \rangle$