

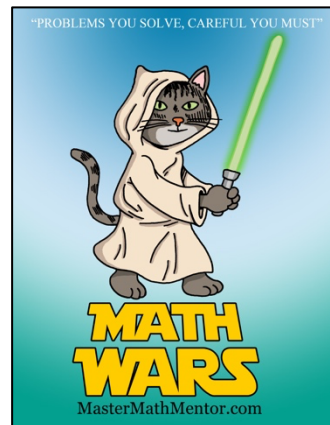
Math Wars – BC Calculus

Scrambled # 251



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=251>



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) $\int \ln x \cdot e^x dx$ can be written

A. $\ln x \cdot e^x - \int \frac{e^x}{x} dx$

B. $\frac{e^x}{x} - \int \frac{e^x}{x} dx$

C. $\ln x - \int \frac{e^x}{x} dx$

D. $e^x - \int \frac{\ln x}{x} dx$

2. (3 pts) We are given that $f(x) > 0$ for all x . Suppose $\sum_{n=1}^{\infty} \frac{1}{f(n)}$ converges. If a is a positive constant, consider the convergence of the following three series. Choose the most accurate answer.

I. $\sum_{n=1}^{\infty} \frac{a}{f(n)}$

II. $\sum_{n=1}^{\infty} \frac{1}{f(n)+a}$

III. $\sum_{n=1}^{\infty} \frac{1}{f(n)-a}$

A. I, II and III must all converge

B. I and II must converge, III could converge

C. I must converge, II and III could converge

D. I, II and III could converge

3. (5 pts) How many of the following sequences converge?

I. $a_n = \{\cos(\pi n)\}$

II. $b_n = \left\{ \frac{4n^2 - 3n + 2}{-2n^2 - 5n + 1} \right\}$

c. $c_n = \left\{ \frac{n^3 - n^2}{e^{2n}} \right\}$

A. 3

B. 2

C. 1

D. 0

4. (7 pts) Use the 2nd degree Taylor polynomial about $x = 0$ for $f(x) = e^{-x/4}$ to approximate $e^{1/2}$.

A. $\frac{25}{32}$

B. $\frac{41}{32}$

C. $\frac{7}{8}$

D. $\frac{13}{8}$

5. (9 pts) A relation is defined parametrically. Its position in the plane is $(x(t), y(t))$ with $\frac{dx}{dt} = \cos t$ and $\frac{dy}{dt} = \sin t \cos t$. If the particle is at the point $(-3, 2)$ at $t = 0$, find the position of the particle at $t = \pi/6$.

A. $\left(\frac{-5}{2}, \frac{17}{8}\right)$

B. $\left(\frac{-5}{2}, \frac{9}{4}\right)$

C. $\left(\frac{1}{2}, \frac{1}{4}\right)$

D. $\left(\frac{1}{2}, \frac{1}{8}\right)$