

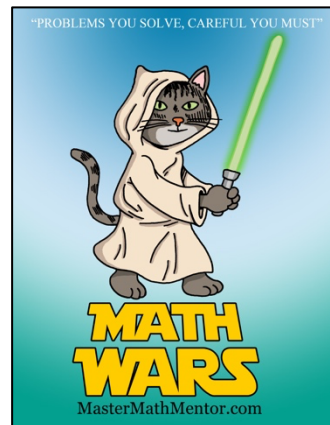
Math Wars – BC Calculus

Topic 217 – Alternating Series



Maximum Time: 7.5 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=217>



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) Which of the following series converge?

I. $8 - 8 + 8 - 8 + 8 - 8 + \dots$

II. $1 - 2 + 4 - 8 + 16 - 32 + \dots$

- A. I only
C. Both I and II

- B. II only
D. Neither I nor II

2. (3 pts) Which of the following series converge?

I. $\sum_{n=0}^{\infty} \frac{(-1)^n n}{n^2 + 4}$

II. $\sum_{n=0}^{\infty} \frac{(-1)^n n^2}{n^2 + 4}$

- A. I only
C. Both I and II

- B. II only
D. Neither I nor II

3. (5 pts) Consider $\sum_{n=1}^{\infty} \frac{(\cos \pi n) \sin n}{n^2}$. In determining possible convergence, consider test I and then if inconclusive, test II. What is the conclusion and the test used to determine that?

I. Alternating Test

II. Direct Comparison Test

- A. Convergent I
C. Divergent I

- B. Convergent II
D. Divergent II

4. (7 pts) Consider $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} \sqrt{x}}{x+10}$. Which statement is true?

A. It converges because the terms decrease and $\lim_{n \rightarrow \infty} \frac{(-1)^{n+1} \sqrt{n}}{n+10} = 0$

B. It converges because the terms start to decrease if $n > 10$ and $\lim_{n \rightarrow \infty} \frac{(-1)^{n+1} \sqrt{n}}{n+10} = 0$

C. It converges because the terms start to decrease if $n > 100$ and $\lim_{n \rightarrow \infty} \frac{(-1)^{n+1} \sqrt{n}}{n+10} = 0$

D. It diverges

5. (9 pts) 5. Which of the following series is absolutely convergent?

I. $\sum_{n=0}^{\infty} \frac{(-1)^n}{2n+3}$

II. $\sum_{n=0}^{\infty} \frac{(-1)^n}{\sqrt{2n+3}}$

III. $\sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+3)^2}$

A. I only

B. II only

C. III only

D. I and III only