

AP Calculus Homework 24

Please write your answer on a separate piece of paper and submit it on Classkick or write your answer directly on Classkick.

Please write all answers in exact forms. For example, write π instead of 3.14.

1. Test the series for convergence or divergence.

a) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{2n+1}$ b) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{e^{1/n}}{n}$

c) $\sum_{n=1}^{\infty} (-1)^n \sin\left(\frac{\pi}{n}\right)$ d) $\sum_{n=1}^{\infty} (-1)^n \frac{n^n}{n!}$

2. Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

a) $\sum_{n=0}^{\infty} \frac{(-10)^n}{n!}$ b) $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\sqrt[4]{n}}$ c) $\sum_{n=1}^{\infty} \frac{(-1)^n e^{1/n}}{n^3}$

d) $\sum_{n=1}^{\infty} \left(1 + \frac{1}{n}\right)^{n^2}$ e) $\sum_{n=1}^{\infty} \left(\frac{n^2+1}{2n^2+1}\right)^n$ f) $\sum_{n=1}^{\infty} \frac{2 \cdot 4 \cdot 6 \cdots (2n)}{n!}$

3. Find the radius of convergence and interval of convergence of the series.

a) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1} x^n}{n^3}$ b) $\sum_{n=0}^{\infty} \frac{x^n}{n!}$ c) $\sum_{n=1}^{\infty} \frac{(-2)^n x^n}{\sqrt[4]{n}}$

d) $\sum_{n=1}^{\infty} \frac{3^n (x+4)^n}{\sqrt{n}}$ e) $\sum_{n=1}^{\infty} \frac{(x-2)^n}{n^n}$

4. What are all values of x for which the series $\sum_{n=1}^{\infty} \frac{x^n}{n}$ converges?

- (A) $-1 \leq x \leq 1$ (B) $-1 < x \leq 1$ (C) $-1 \leq x < 1$
(D) $-1 < x < 1$ (E) All real x

5. The interval of convergence of $\sum_{n=0}^{\infty} \frac{(x-1)^n}{3^n}$ is

- (A) $-3 < x \leq 3$ (B) $-3 \leq x \leq 3$ (C) $-2 < x < 4$
(D) $-2 \leq x < 4$ (E) $0 \leq x \leq 2$

6. What are all values of x for which the series $\sum_{n=1}^{\infty} \frac{(x-2)^n}{n \cdot 3^n}$ converges?

- (A) $-3 \leq x \leq 3$ (B) $-3 < x < 3$ (C) $-1 < x \leq 5$
(D) $-1 \leq x \leq 5$ (E) $-1 \leq x < 5$