

Multiple choice questions for Ch. 12.1, 12.2, 12.3

Math 104, Spring 09

Show your work. No partial credit is given, but a correct guess without supporting work receives no credit.

1. Evaluate the limit

$$\lim_{n \rightarrow \infty} \frac{2n + \cos 3n}{n + 5\sqrt{n+1}}.$$

- A.) 2 B.) 2/5 C.) 3 D.) 3/5 E.) 0 F.) divergent

2. Find the value of the series

$$\sum_{n=2}^{\infty} \frac{2^{2n-1}}{\pi^n}.$$

Note: This series starts at $n = 2$.

A.) 0 B.) $\frac{2}{\pi-4}$ C.) $\frac{8}{\pi-8}$ D.) $\frac{2}{\pi(\pi-2)}$ E.) $\frac{8}{\pi(\pi-4)}$ F.) divergent

3. We approximate the value of the p -series with $p = 5$

$$\sum_{n=1}^{\infty} \frac{1}{n^5}$$

by calculating the partial sum

$$s_4 = 1 + \frac{1}{2^5} + \frac{1}{3^5} + \frac{1}{4^5} = 1.03634\dots$$

Find a lower and upper bound for the exact value of the series based on this partial sum by estimating the remainder term R_4 using integration.

- A.) $1.03617 \leq \sum \frac{1}{n^5} \leq 1.03674$
- B.) $1.03674 \leq \sum \frac{1}{n^5} \leq 1.03732$
- C.) $1.03732 \leq \sum \frac{1}{n^5} \leq 1.03790$
- D.) $1.03790 \leq \sum \frac{1}{n^5} \leq 1.03848$
- E.) $1.03848 \leq \sum \frac{1}{n^5} \leq 1.03904$
- F.) $1.03904 \leq \sum \frac{1}{n^5} \leq 1.03962$