

**Multiple choice problems for sections 12.2–12.7**

*Math 104, Fall 2008.*

Credit is given only if you choose the correct answer *and* show supporting work.

1. Find the value of the series,

$$\sum_{n=1}^{\infty} \frac{1+3^n}{4^{n-1}} = 4 + \frac{10}{4} + \frac{28}{16} + \frac{82}{64} + \cdots .$$

- A.) 13    B.)  $\frac{27}{2}$     C.) 14    D.)  $\frac{40}{3}$     E.) 15    F.) The series diverges

2. For each of the following series, determine whether it converges or diverges.

$$(1) \sum_{n=1}^{\infty} \frac{n+5}{n\sqrt{n+3}}$$

$$(2) \sum_{n=1}^{\infty} \frac{3 + \cos n}{e^n}$$

$$(3) \sum_{n=1}^{\infty} \frac{\ln n}{n^2}$$

- A.) All three series diverge.
- B.) Only series (1) converges.
- C.) Only series (2) converges.
- D.) Only series (3) converges.
- E.) Series (1) and (2) converge, while (3) diverges.
- F.) Series (2) and (3) converge, while (1) diverges.

3. For each of the following series, determine whether it converges absolutely, converges conditionally, or diverges.

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

$$(2) \sum_{n=1}^{\infty} \frac{\cos n}{n^2 + \sqrt{n}}$$

$$(3) \sum_{n=1}^{\infty} (-1)^n \frac{n!}{\pi^n}$$

Which of the following statements is true? (There is only one correct answer.)

- A.) Series (1) converges conditionally, while (2) and (3) diverge.
- B.) Series (1) and (2) converge absolutely, while (3) converges conditionally.
- C.) Series (1) converges conditionally, while (2) and (3) diverge.
- D.) All three series converge absolutely.
- E.) All three series converge conditionally.
- F.) Series (1) converges conditionally, series (2) converges absolutely, while (3) diverges.