MATH 214 (R1) Winter 2008
Intermediate Calculus I

Problem Set #3

Completion Date: Monday February 4, 2008

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Question 1. [Sec. 12.6, # 4] Determine whether the series

$$\sum_{n=1}^{\infty} \frac{2^n}{n^4}$$

is absolutely convergent, conditionally convergent, or divergent.

Question 2. [Sec. 12.6, # 8] Determine whether the series

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

is absolutely convergent, conditionally convergent, or divergent.

Question 3. [Sec. 12.6, # 14] Determine whether the series

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

is absolutely convergent, conditionally convergent, or divergent.

Question 4. [Sec. 12.6, # 16] Determine whether the series

$$\sum_{n=1}^{\infty} \frac{3 - \cos n}{n^{2/3} - 2}$$

is absolutely convergent, conditionally convergent, or divergent.

Question 5. [Sec. 12.6, # 18] Determine whether the series

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

is absolutely convergent, conditionally convergent, or divergent.

Question 6. [Sec. 12.6, # 22] Determine whether the series

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

is absolutely convergent, conditionally convergent, or divergent.

Question 7. [Sec. 12.6, # 24] Determine whether the series

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{(\arctan n)^n}$$

is absolutely convergent, conditionally convergent, or divergent.

Question 8. [Sec. 12.6, # 32] For which positive integers k is the series $\displaystyle\sum_{n=1}^{\infty} \frac{(n!)^2}{(kn)!}$ convergent?

Question 9. [Sec. 12.7, # 10] Test the series $\displaystyle\sum_{n=1}^{\infty} n^2 e^{-n^3}$ for convergence or divergence.

Question 10. [Sec. 12.7, # 24] Test the series $\displaystyle\sum_{n=1}^{\infty} \frac{\cos(n/2)}{n^2 + 4n}$ for convergence or divergence.

Question 11. [Sec. 12.7, # 28] Test the series $\displaystyle\sum_{n=1}^{\infty} \frac{e^{1/n}}{n^2}$ for convergence or divergence.

Question 12. [Sec. 12.7, # 32] Test the series $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)^n}{n^{2n}}$ for convergence or divergence.

Question 13. [Sec. 12.8, # 16] Find the radius of convergence and interval of convergence of the power series

$$\sum_{n=0}^{\infty} n^3 (x-5)^n.$$

Question 14. [Sec. 12.8, # 20] Find the radius of convergence and interval of convergence of the power series

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

Question 15. [Sec. 12.8, # 28] Find the radius of convergence and interval of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{2 \cdot 4 \cdot 6 \cdot \cdots \cdot (2n)}{1 \cdot 3 \cdot 5 \cdot \cdots \cdot (2n-1)} x^n.$$