Philadelphia University
Department of basic sciences and mathematics

Second Exam | Calculus 2 | 20-12-2016

Name: _____ Serial: _____ Section: _____

Question1: (12 points) Write the symbol of the most correct choice in the table below.

1	2	3	4	5	6

1) The sum of the series $\sum_{n=1}^{\infty} \frac{3^{n+1}}{2^{2n-1}}$ is

a) 24 b) 18

c) $1/12$ d) $1/15$

e) Divergent

2) The sequence $a_n = \tan^{-1}\left(\frac{3+2n}{2n-1}\right)$ converges to

a) $\pi/2$ b) $-\pi/2$

c) $\pi/4$ d) $-\pi/4$

e) 0

3) If the recursively defined sequence $a_{n+1} = \frac{1}{9}\left(a_n + \frac{2}{a_n}\right)$ is known to converge for a given initial value $a_1 > 0$. Then the limit of the sequence is

a) 4 b) $1/2$

c) 3 d) $1/3$

e) $1/4$

4) If the nth term of the sequence of partial sums of the series $\sum a_n$ is given by $s_n = \frac{3n+2}{2n+4}$. Then the sum of the series $\sum a_n$ is

a) 1 b) $1/2$

c) $3/2$ d) $5/6$

e) Divergent

5) The values of p such that $\sum_{n=1}^{\infty} \frac{(2p+1)^n}{n}$ converges, are

a) $-2 \le p < 0$ b) $0 \le p < 1$

c) $-1 < p < 1$ d) $-1 \le p \le 1$

e) $-1 \le p < 0$

6) Let $a_n = \frac{\sqrt{n}}{n+1}$. Then

a) The sequence $\{a_n\}_n^{\infty}$ converges, and the series $\sum_{n=1}^{\infty} a_n$ diverges.

b) The sequence $\{a_n\}_n^{\infty}$ converges, and the series $\sum_{n=1}^{\infty} a_n$ converges.

c) The sequence $\{a_n\}_n^{\infty}$ diverges, and the series $\sum_{n=1}^{\infty} a_n$ diverges.

d) The sequence $\{a_n\}_n^{\infty}$ diverges, and the series $\sum_{n=1}^{\infty} a_n$ converges.

Question2: (3 points)

Find the **sum** of the following series

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

Question3: (3 points)

Determine if the following series is **absolutely** convergent, **conditionally** convergent or **divergent**.

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

Question4: (4 points)

Determine whether the series converges or diverges. **Justify** your answer.

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

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