The University of Western Ontario (Western University)

## Calculus 1501B, Winter 2014 Homework assignment 3 (22 marks total).

Due on Tuesday March 11, in class.

[*Note*: this assignment will not be marked before March 14th but the solutions will be posted on Wed. March 12.]

#### Problem 1. (4 marks)

Use the Integral Test to determine whether each of the following series is convergent or divergent:

(a) 
$$\sum_{n=1}^{\infty} \frac{1}{n^2 + 4n + 9}$$
  
(b)  $\sum_{n=1}^{\infty} \frac{1}{2\sqrt{n} - 1}$ 

### Problem 2. (4 marks)

Use the Comparison Test to determine whether the series is convergent or divergent

(a) 
$$\sum_{n=1}^{\infty} \frac{\arctan n}{n^3}$$
  
(b)  $\sum_{n=1}^{\infty} \frac{1}{n-0.3}$ 

#### Problem 3. (4 marks)

Use the Limit Comparison Test to determine whether each of the following series is convergent or divergent

(a) 
$$\sum_{n=1}^{\infty} \frac{e^n + n}{5^n + 3}$$
  
(b) 
$$\sum_{n=1}^{\infty} \frac{n\sqrt{n} + \cos n}{n^2\sqrt{n} + n + 1}$$

# Problem 4. (4 marks)

Use the Alternating Series Test to test the series for convergence

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

Is it absolutely convergent ? If so, what is  $\sum_{n=1}^{\infty} e^{-2n}$  ?

#### Problem 5. (2 marks)

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

$$\sum_{n=1}^{\infty} (-1)^n \frac{1}{n^{0.2}}$$

## Problem 6. (4 marks)

(a) Use the Ratio Test to determine whether the series is absolutely convergent or divergent:

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

(b) Use the Root Test to determine whether the series is absolutely convergent or divergent:

$$\sum_{n=5}^{\infty} \left( \frac{2\ln n + e^{-n}}{\ln n + |\sin(\frac{n}{3})|} \right)^{en}$$