

**Department of Mathematics**  
**MTH 240 (Calculus II) - Winter 2012**

**Test #3**

1. **Date/Time** : Apr. 16, 2012 (Monday)/15:00-16:30 ( 90 minutes)
2. **Covering Material** : Sections 11.8-11.11 and 14.3, 14.5, and 14.7
3. The use of notes, formula sheets, books or calculators is not allowed.
4. Bring picture ID.
5. **Seat** : Students must take the test in her/his own seat in MTCC-A. MTCC information is posted for students on RAMSS along with their exam schedule. A link is provided for the MTCC map and written instructions for parking, access by car, subway etc <http://www.mtccc.com/parkingandmaps.cfm>
6. **Test #3 in Winter 2011**

1. [10 marks] Find the radius of convergence and interval of convergence of the series

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

2. [10 marks] Find the Maclaurin series of  $f(x) = \frac{x}{(2-x)^2}$  and its interval of convergence.

3. [10 marks] Find the 3rd degree Taylor polynomial  $T_3(x)$  of  $f(x) = \sec(x)$  at  $a = \pi/3$ .

4. [(6+4) marks]

- (a) If  $u = \arctan(xy + z)$ , where

$$x = s^2 + t^2, \quad y = 9re^{st}, \quad z = r^2st$$

find the value of  $\frac{\partial u}{\partial s}$  when  $r = 2$ ,  $s = 1$ ,  $t = 0$ .

- (b) Find  $w_y$  if  $w = f(x, y)$  is defined by the equation:  $\sin(xy + w) + \ln(y^2 + w^2) = 10 - w$ .

5. [10 marks] Find the absolute maximum and minimum values of

$$f(x, y) = x^3 - 3x - y^3 + 12y + 2$$

on the set  $D$ , where  $D$  is quadrilateral whose vertices are  $(-2, 3)$ ,  $(2, 3)$ ,  $(2, 2)$ , and  $(-2, -2)$ .