University of Toronto Scarborough
Department of Computer & Mathematical Sciences

MAT B41H **2013/2014**

Assignment #10

The Final Examination will take place on **December 17, from 7 pm – 10 pm**

Final Exam Room Assignments	
Surname	go to room
A to G	IC 220
H to Z	IC 130

This assignment will not be collected. The solution set should be available at the end of term.

A. Suggested reading:

1. Marsden & Tromba, Chapter 1, section 1.4.
2. Marsden & Tromba, Chapter 6, sections 6.1–6.3.

B. Problems:

1. Find the volume of the solid bounded by the paraboloid $z = 4x^2 + y^2$ and the cylinder $y^2 + z = 2$.
2. Give a rough sketch of the graphs of the polar equations.
   (a) $r = \csc\theta$
   (b) $r = 1 - \sqrt{2}\,\sin\theta$
   (c) $r = -\sin 3\theta$
3. Find the area of the region which is inside $(x-1)^2 + y^2 = 1$ and outside $x^2 + y^2 = 1$.
4. Evaluate $\displaystyle\int_0^1 \int_0^{\sqrt{1-x^2}} (x^2+y^2)^{5/2}\,dy\,dx$.
5. Find the entire area bounded by the polar graph $r = 1 + \cos\theta$.

6. Evaluate $\iiint_S \frac{dx\,dy\,dz}{(x^2+y^2+z^2)^{3/2}}$, where S is the solid bounded by the two spheres $x^2+y^2+z^2=a^2$ and $x^2+y^2+z^2=b^2$, where $0<a<b$.
   (page 328, #25)

7. Evaluate $\iiint_B z\,dx\,dy\,dz$ by using cylindrical coordinates, where B is the region within the cylinder $x^2+y^2=1$ above the xy– plane and below the cone $z=(x^2+y^2)^{1/2}$.
   (page 328, #30(a))

8. Find the volume of the region bounded by $x=y^2+z^2$, $z=y^2$, $z=9$ and $x=0$.

9. Evaluate $\int_D e^{3x}\,dA$ where D is the parallelogram bounded by the lines $2x-y=0$, $x-2y=0$, $2x-y=6$ and $x-2y=-2$.

10. Evaluate $\int_D (x^2+y^2)\cos(xy)\,dA$, where D is the region to the right of the y–axis that is bounded by the hyperbolas $y=\frac{3}{x}$, $y=\frac{-3}{x}$, $x^2-y^2=1$ and $x^2-y^2=9$.

11. Evaluate $\int_B \sqrt{x+y+z}\,dV$, where B is the parallelepiped bounded by $x+y+z=0$, $x+y+z=9$, $x+2y=1$, $x+2y=4$, $y-3z=2$ and $y-3z=6$.

12. Find the volume of the region bounded by $\frac{x^2}{2}+\frac{y^2}{8}=z^2+1$, $z=1$ and $z=-1$.