Name: ______________________________ **ID Number:** ____________________

TA: ______________________________ **Section Time:** ____________________

MTH 234
Exam 3: Practice
November 9, 2010
50 minutes
Sects: 15.1-15.4, 15.6

No calculators or any other devices allowed.
If any question is not clear, ask for clarification.
No credit will be given for illegible solutions.
If you present different answers for the same problem, the worst answer will be graded.
Show all your work. $\boxed{\textit{Box your answers.}}$

1. (26 points) Consider the integral $\displaystyle\iint_D f(x,y)\,dA = \int_0^3 \int_{-2\sqrt{1-\frac{x^2}{3^2}}}^{2(1-\frac{x}{3})} f(x,y)\,dy\,dx.$

(a) (8 points) Sketch the region of integration.

(b) (8 points) Switch the order of integration in the above integral.

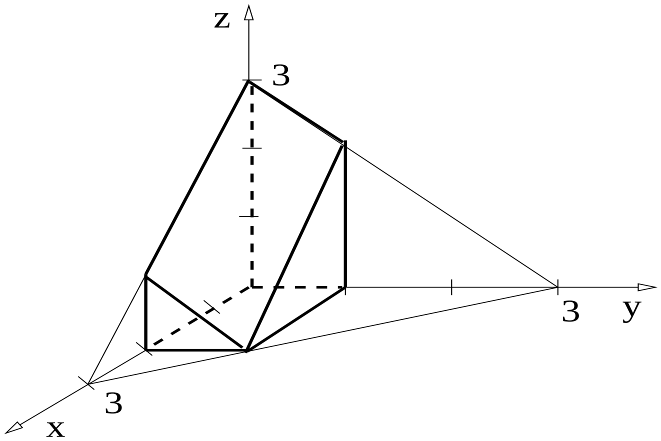
(c) (10 points) Compute the integral $\displaystyle\iint_D f(x,y)\,dA$ for the case $f(x,y) = xy$.

2. (20 points) Find the component x of the centroid vector in Cartesian coordinates in the plane of the region $R = \{(x, y) \in \mathbb{R}^2 \;:\; x \geqslant 0, \quad y \geqslant 0, \quad x^2 + y^2 \leqslant 2^2\}$.

3. (16 points) Transform to polar coordinates and then evaluate the integral

$$I = \int_{-1}^{1} \int_{0}^{\sqrt{1-y^2}} \left(x^2 + y^2\right)^{3/2} \, dx \, dy.$$

4. (18 points) Find the volume of a parallelepiped whose base is a rectangle in the $z = 0$ plane given by $0 \leqslant y \leqslant 1$ and $0 \leqslant x \leqslant 2$, while the top side lies in the plane $x+y+z = 3$.



5. (20 points) Consider the region of $R \subset \mathbb{R}^3$ given by

$$R = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 \leqslant 1, \quad 0 \leqslant z \leqslant 1 + x^2 + y^2\}.$$

(a) (5 points) Sketch the region R.

(b) (15 points) Use cylindrical coordinates to compute the volume of that region.

#	Pts	Score
1	26	
2	20	
3	16	
4	18	
5	20	
Σ	100	