Ma 227 **Exam I B** **10/4/12**

Name: _____

Lecture Section: _____

I pledge my honor that I have abided by the Stevens Honor System. _____

You may not use a calculator, **cell phone**, **or computer while taking this exam**. **All work must be shown to obtain full credit**. **Credit will not be given for work not reasonably supported**. **When you finish**, **be sure to sign the pledge**.
There is a table of integrals on the last page of the exam.

Score on Problem #1 _____

#2a _____

#2b _____

#3 _____

#4 _____

Total Score _____

1 [25 **pts**.] Evaluate

$$\int_0^2 \int_y^2 e^{x^2} dxdy$$

Sketch the region of integration.

2 a [20 **pts**.] Evaluate

$$\iint_R \left(x^2 + y^2\right) dA$$

where R is the circle $x^2 + y^2 = 2y$. Sketch R.

2 b [15 **pts**.] Give an integral in polar coordinates for the surface area of the part of the hyperboloid $z = x^2 - y^2$ that lies within the cylinder $x^2 + y^2 = 1$. DO NOT EVALUATE THIS INTEGRAL.

3 [20 **pts**.] Use cylindrical coordinates to set up an iterated triple integral for the volume of the solid that lies within both the cylinder $x^2 + y^2 = 4$ and the sphere $x^2 + y^2 + z^2 = 9$. DO NOT EVALUATE THIS INTEGRAL.

4 [20 **pts**.] Use spherical coordinates to evaluate

$$\int_{-2}^{2}\int_{0}^{\sqrt{4-x^2}}\int_{-\sqrt{4-x^2-y^2}}^{\sqrt{4-x^2-y^2}} y^2\sqrt{x^2+y^2+z^2}\,dzdydx$$

Table of Integrals

$\int \sin^2 x dx = -\frac{1}{2}\cos x \sin x + \frac{1}{2}x + C$
$\int \cos^2 x dx = \frac{1}{2}\cos x \sin x + \frac{1}{2}x + C$
$\int \sin^3 x dx = -\frac{1}{3}\sin^2 x \cos x - \frac{2}{3}\cos x + C$
$\int \cos^3 x dx = \frac{1}{3}\cos^2 x \sin x + \frac{2}{3}\sin x + C$
$\int \sin^4 x dx = \frac{3}{8}x - \frac{1}{4}\sin 2x + \frac{1}{32}\sin 4x + C$
$\int \cos^4 x dx = \frac{3}{8}x + \frac{1}{4}\sin 2x + \frac{1}{32}\sin 4x + C$
$\int te^{at} dt = \frac{1}{a^2}e^{at}(at - 1) + C$
$\int t^2 e^{at} dt = \frac{1}{a^3}e^{at}\left(a^2t^2 - 2at + 2\right) + C$