Ma 227 **Exam II A** **11/8/11**

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

$$\int_0^1 \int_x^1 x\sqrt{1+y^3}\, dydx$$

Sketch the region of integration.

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

$$\iint_R 2xy\,dA$$

where R is the region in the second quadrant that lies between the circles of radius 2 and 5 centered at the origin. Sketch R.

2 b [15 **pts**.] Give an integral in polar coordinates for the surface area of the part of the paraboloid $z = x^2 + y^2$ that lies under the plane $z = 9$. 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 under the paraboloid $z = x^2 + y^2$, above the plane $z = 0$ and inside the cylinder $x^2 + y^2 = 2x$. DO NOT EVALUATE THIS INTEGRAL.

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

$$\iiint_E 16z\,dV$$

where E is the upper half of the sphere $x^2 + y^2 + z^2 = 1$.

Table of Integrals

$\int \sin^2 x dx = -\frac{1}{2}\cos x \sin x + \frac{1}{2}x + C$
$\int \cos^2 x dx = \frac{1}{2}\cos x \sin x + \frac{1}{2}x + C$
$\int \sin^3 x dx = -\frac{1}{3}\sin^2 x \cos x - \frac{2}{3}\cos x + C$
$\int \cos^3 x dx = \frac{1}{3}\cos^2 x \sin x + \frac{2}{3}\sin x + C$
$\int \sin^4 x dx = \frac{3}{8}x - \frac{3}{16}\pi - \frac{1}{4}\sin 2x + \frac{1}{32}\sin 4x + C$
$\int \cos^4 x dx = \frac{3}{8}x + \frac{1}{4}\sin 2x + \frac{1}{32}\sin 4x + C$
$\int t e^{at} dt = \frac{1}{a^2} e^{at}(at - 1) + C$
$\int t^2 e^{at} dt = \frac{1}{a^3} e^{at}\left(a^2 t^2 - 2at + 2\right) + C$