

MATH 261 EXAM 3, Fall 2003

Simplify all answers. Show your work!		Name:	Score	
1.	a) Find $\int_0^1 \int_0^1 (xye^{x^2}) dydx$	b) Find $\int_0^1 \int_0^1 \int_0^1 (x + z^3) dzdydx$	1	
			2	
			3	
			4	
			5	
			6	
Ans:_____.		Ans:_____.		
2.	Let $I = \iint_R dydx$, over the region R bounded by $x = y^2 - 3y$ and $x = y$. a) Sketch the region and set up the integral	b) Compute the integral	7	
			8	
			9	
			10	
			Tot	
Ans:_____.		Ans:_____.		
3.	Let $I = \int_0^2 \int_{y/2}^1 e^{-x^2} dx dy$. a) Reverse the order of integration.	b) Compute the integral.		
			Ans:_____.	
4.	Let $I = \int_{-1}^0 \int_0^{\sqrt{1-x^2}} (1 - x^2 - y^2)^{1/2} dy dx$. a) Convert to polar coordinates.	b) Evaluate the integral.		
			Ans:_____.	
5.	Write the equation of the cone $z^2 = 3x^2 + 3y^2$: a) In cylindrical coordinates.	b) In spherical coordinates.		
			Ans:_____.	
Extra Space				

Part II.	Name:	
6.	<p>Let V be the volume bounded by $z = 10 - x^2 - y^2$ and $z = x^2 + y^2 + 2$.</p> <p>a) Set up the volume integral in polar coord.</p> <p style="text-align: right;">Ans:_____.</p>	<p>b) Compute the integral.</p> <p style="text-align: right;">Ans:_____.</p>
7.	<p>A lamina with $\sigma = x^2 + y^2$ is bounded by $y = \sqrt{16 - x^2}$ and $y = 0$. Set up the integrals for:</p> <p>a) The c.m. coordinate \bar{y}.</p> <p style="text-align: right;">Ans:_____.</p>	<p>b) The moment of inertia I_z.</p> <p style="text-align: right;">Ans:_____.</p>
8.	<p>Let E be the tetrahedrum bounded by the coordinate planes and the plane $6x + 2y - 3z = 12$. Set up two equivalent triple integrals to compute the volume.</p> <p>a)</p> <p style="text-align: right;">Ans:_____.</p>	<p>b)</p> <p style="text-align: right;">Ans:_____.</p>
9.	<p>Given: $I = \int_{-2}^0 \int_0^{\sqrt{4-y^2}} \int_0^{\sqrt{4-x^2-y^2}} (x^2 + y^2 + z^2)^{1/2} dz dx dy$</p> <p>a) Change the integral to spherical coordinates.</p> <p style="text-align: right;">Ans:_____.</p>	<p>b) Compute the integral.</p> <p style="text-align: right;">Ans:_____.</p>
10.	<p>Given the coordinate transformation $x = u \cosh v$, $y = u \sinh v$.</p> <p>a) Find $dx \wedge dy$.</p> <p style="text-align: right;">Ans:_____.</p>	<p>b) Find the Jacobian of the transformation.</p> <p style="text-align: right;">Ans:_____.</p>
	Extra space	