

MATH 261 EXAM 3, Spring 2021

Simplify all answers. <b>Show your work!</b>		Name:	Score
1.	a) Find $\int \int_R ye^{xy} dydx$ ; $R = [0, 2] \times [0, 2]$ .  Ans:_____.	b) Find $\int_0^2 \int_0^1 x/(y^2 + 1) dydx$  Ans:_____.	1 2 3 4 5 6
2.	Find the volume in the first octant bounded by $z = 9 - y^2$ and $y = x$ . a) Set up the integral.  Ans:_____.	b) Evaluate the integral.  Ans:_____.	7 8 9 10 Tot
3.	Let $I = \int_0^1 \int_{x^2}^1 x^3 e^{y^3} dydx$ . a) Reverse the order of integration.  Ans:_____.	b) Compute the integral.  Ans:_____.	
4.	Let $I = \int \int_D xy dydx$ , where $D$ is the region bounded by $x = \sqrt{4 - y^2}$ and $x = 0$ . a) Convert to polar coordinates.  Ans:_____.	b) Evaluate the integral.  Ans:_____.	
5.	Convert the equation of the surface $z = \sqrt{3}r$ to: a) Cartesian Coordinates.  Ans:_____.	b) Spherical coordinates.  Ans:_____.	
	Extra Space		

Part II.		Name:
6.	<p>Let <math>V</math> be the volume bounded by the paraboloids <math>y = 3x^2 + 3z^2</math> and <math>y = 4 - x^2 - z^2</math>.</p> <p>a) Set up the volume integral.</p>	<p>b) Compute the integral.</p>
	Ans:_____	Ans:_____
7.	<p>A lamina with <math>\sigma = x^2 + 3y</math> is bounded by <math>y = x - 2</math> and <math>x = y^2</math>. Set up the integrals for:</p> <p>a) The c.m. coordinate <math>\bar{x}</math>.</p>	<p>b) The moment of inertia <math>I_x</math>.</p>
	Ans:_____	Ans:_____
8.	<p>A tetrahedron has vertices at <math>P(1, 0, 0)</math>, <math>Q(0, 1, 0)</math>, <math>R(0, 0, 1)</math> and <math>(0, 0, 0)</math>.</p> <p>a) Write the equation of the plane <math>PQR</math>.</p>	<p>b) Set up an integral for the volume.</p>
	Ans:_____	Ans:_____
9.	<p>Use spherical coordinates to evaluate <math>\int \int \int_E z \, dV</math> where <math>E</math> is the region bounded by <math>z = \sqrt{1 - x^2 - y^2}</math>, <math>z = \sqrt{9 - x^2 - y^2}</math>, and <math>z = 0</math>.</p> <p>a) Set up the integral.</p>	<p>b) Compute the integral.</p>
	Ans:_____	Ans:_____
10.	<p>Compute the Jacobian of the following transformations:</p> <p>a) <math>x = uv</math>, <math>y = 4u + 3v</math>.</p>	<p>b) <math>x = uv</math>, <math>y = 4u + 3v</math>, <math>z = 5w</math>.</p>
	Ans:_____	Ans:_____
	Extra space	