

STUDENT NAME: _____

Test 3

Calculus III - MA 227 7B

April 04, 2007

Time : 60 min

Instructions

This test consists of two parts.

There are 5 questions in this part, each worth 4 points, for a total of 20 points.

In Part II, there are 3 questions, each worth 10 points, for a total of 30 points.

You may use the back of the pages if the space next to questions is insufficient. The back pages may also be used for scratch work. However clearly indicate so if you are using it for scratch. **Leave all test sheets stapled.**

Do NOT write in this box

Part I	_____
Question 6	_____
Question 7	_____
Question 8	_____
Total	_____

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Part I

Write your answers in the place indicated

Question 1. Evaluate $\int_4^2 \int_1^{-1} (x^2 + xy^2) dy dx$

.....

Question 2. Express the given integral into an equivalent iterated integral with the order of integration reversed.

$$\int_0^1 \int_{y^2}^1 y^3 \sin(x^3) dx dy$$

(Do not evaluate any of the integrals).

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Question 3. Express the given integral into an equivalent integral in polar coordinates.

$$\int_0^2 \int_0^{\sqrt{2x-x^2}} \frac{1}{\sqrt{x^2+y^2}} dy dx$$

(Do not evaluate any of the integrals).

.....
Question 4. Set up a double integral in polar coordinates to find the volume below the paraboloid $z = 18 - 2x^2 - 2y^2$ and above the xy -plane. (Do not evaluate the integral).

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Question 5. Evaluate $\int_0^3 \int_0^1 \int_0^{\sqrt{1-z^2}} ze^y dx dz dy$

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Part II

Question 6. A lamina occupies the region inside the circle $x^2 + y^2 = 2x$ but outside the circle $x^2 + y^2 = 1$, and the mass density function is $\rho(x, y) = (x^2 + y^2)^{-1/2}$. Find the mass of the lamina.

(10 points)

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Question 7. Find *surface area* of the paraboloid $2x^2 + 2y^2 + z = 32$ that lies in the first octant.

(10 points)

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Question 8. Find volume of the tetrahedron with vertices at $(0,0,0)$, $(1,0,0)$, $(0,2,0)$ and $(0,0,3)$.

(10 points)