FALL 2008 — MA 227– TEST 3

Name: ______________________________

1. Part I

There are 6 problems in Part 1, each worth 4 points. Place your answer on the line to the right of the question. Only your answer on the answer line will be graded.

(1) Evaluate $\int_0^1 \int_0^2 2xy\, dy\, dx$.

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(2) Evaluate $\iint_D x dA$ where D denotes the triangle with the vertices $(0,0), (0,1), (1,0)$.

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(3) Evaluate $\iint_D x\, dA$, where D is the region bounded by the lines $x = 0$ and $y = 0$, and satisfying the conditions: $1 \leq x^2 + y^2 \leq 4$ and $x \geq 0, y \geq 0$.

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(4) Find the mass of the lamina bounded by the lines $y = x^3, x = 1, y = 0$ provided the density is $\rho(x, y) = 2$.

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(5) Evaluate the are inside the ellipse $\frac{x^2}{4} + \frac{y^2}{9} = 1$.

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(6) Change the order of integration in the iterated integral:

$\int_0^1 (\int_0^{\sqrt{1-x}} f(x,y)\, dy)\, dx$.

2. Part II

There are 3 problems in Part 2, each worth 12 points. Partial credit is awarded where appropriate. Your solution must include enough detail to justify any conclusions you reach in answering the question.

(1) Evaluate the volume of the solid which lies between the xy-plane, $z = 0$, and the surface $z = 4 - x^2 - y^2$.

(2) Evaluate the triple integral $\iiint_E (x^2+y^2)dV$, where E is the cone, which lies between $z = 2\sqrt{x^2+y^2}$ and $z = 4$.

(3) Calculate the triple integral $\iiint_E y^2\, dV$ using the spherical coordinates, where E is the solid inside the ball $x^2 + y^2 + z^2 = 1$ and additionally satisfying $x \geq 0$ and $y \geq 0$.