

SPRING 2006 — MA 227-6D — TEST 3

Name: \_\_\_\_\_

1. PART I

There are 5 problems in Part I, each worth 4 points. Place your answer on the line below the question. In Part I, there is no need to show your work, since only your answer on the answer line will be graded.

(1) Calculate  $\int_4^{16} \int_0^3 (x + \sqrt{y}) dx dy$ .

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(2) Express  $\iint_D y dA$  where  $D$  is the triangular region with vertices  $(0, 0)$ ,  $(2, 2)$  and  $(6, 0)$  as an iterated integral. Then evaluate.

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(3) Express  $\iint_D x dA$  where  $D = \{(x, y) : 0 \leq x^2 + y^2 \leq 5, 0 \leq x\}$  as an iterated integral. Then evaluate.

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(4) Find the mass of the lamina with constant density  $\rho$  that occupies the region bounded by  $y = 2\sqrt{x}$ ,  $x = 0$ , and  $y = 4$ . Give both, the iterated integral and the final answer.

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(5) Evaluate the integral  $\int_0^2 \int_y^2 \cos(x^2) dx dy$  by revising the order of integration. Give both, the new iterated integral and the final answer.

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## 2. PART II

There are 2 problems in Part II, each worth 10 points. On Part II problems partial credit is awarded where appropriate. Your solution must include enough detail to justify any conclusions you reach in answering the question.

- (1) Find the surface area of the paraboloid  $2x^2 + 2y^2 + z = 32$  that lies in the first octant.

- (2) Find the center of mass of the solid  $E$ , which is bounded by the paraboloid  $z = 8 - 2x^2 - 2y^2$  and the plane  $z = 0$  and lies in the half space  $y \geq 0$ . The density function for  $E$  is  $\rho(x, y, z) = \sqrt{x^2 + y^2}$ .