

## Midterm 1

Thursday, February 15, 2007

Name :

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*INSTRUCTIONS :*

1. There are 7 problems on this midterm (total of 10 pages). Please check that your copy contains all of the 10 pages and obtain a new copy of the exam if it does not.
2. Feel free to use the opposite side.
3. In order to receive full credit for any problem, you must show work leading to your answer. Make sure that your final answer is clearly indicated.
4. No calculators, books, notes etc. are allowed.
5. You have 75 minutes to complete this test.

Problem	Possible points	Score
1	12	
2	14	
3	16	
4	15	
5	16	
6	15	
7	12	
Total	100	

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**Problem 1.** (12%) Evaluate  $\iint_D (x+y)dA$ , where  $D$  is the triangular region with vertices  $(0, 0)$ ,  $(-1, 1)$ ,  $(2, 1)$ .

**Problem 2.** (14%) Evaluate the iterated integral

$$\int_0^2 \int_{x^2}^4 x \sin(y^2) dy dx$$

by reversing the order of integration.

**Problem 3.** (16%) Evaluate the integral

$$\iint_R e^{4x^2+9y^2} dA,$$

where  $R$  is the region bounded by the ellipse  $4x^2 + 9y^2 = 1$ .

**Problem 4.** (15%) Evaluate  $\iiint_E z \, dV$ , where  $E$  is the solid that lies above the paraboloid  $z = x^2 + y^2$  and below the half cone  $z = \sqrt{x^2 + y^2}$ .

**Problem 5.** (16%) Evaluate  $\iiint_E y \, dV$ , where  $E$  is enclosed by the sphere  $x^2 + y^2 + z^2 = 1$  in the first octant.

**Problem 6.** (15%) Find the volume of the solid that lies inside the sphere  $x^2 + y^2 + z^2 = 9$  and outside the cylinder  $x^2 + y^2 = 1$ .

**Problem 7.** Let  $E$  be the solid that lies inside both cylinders  $x^2 + z^2 = 1$  and  $y^2 + z^2 = 1$ .

(a) (6%) Express the volume of  $E$  as an iterated integral in the order  $dx dy dz$ .

(b) (6%) Evaluate the iterated integral in (a).

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