

Final Examination [40 points], Wednesday, June 9, Spring 2010
MATH 210 Calculus III, Section 53, Dr. Masayoshi Kaneda
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Name (Printed):

Student ID:

The quiz will be first graded out of 80 points, and then the score is converted to be out of 40 points.

1. (Exercise 12.7.37, homework, covered in lab) [18 points] Find the absolute extrema of the function $f(x, y) = x^2 + 3y - 3xy$ on the region bounded by $y = x$, $y = 0$, and $x = 2$.

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2. (Exercise 13.1.55, homework, covered in lab) [7 points] Evaluate the iterated integral by first changing the order of integration.

$$\int_0^1 \int_y^1 3xe^{(x^3)} dx dy$$

3. (Exercise 13.2.17, homework, covered in lab) [10 points] Compute the volume of the solid lying in the first octant bounded by $z = 1 - y^2$, $x + y = 1$, and three coordinate planes.

4. (Example 13.5.3) [14 points] Evaluate $\iiint_Q 6xy dV$, where Q is the tetrahedron bounded by the planes $x = 0$, $y = 0$, $z = 0$, and $2x + y + z = 4$. [Hint: It would be easier to integrate with respect to y first, then z , and finally x .]

5. (Example 13.6.5, covered in class, modified) [15 points] Evaluate the triple iterated integral using cylindrical coordinates.

$$\int_{-1}^1 \int_0^{\sqrt{1-x^2}} \int_{x^2+y^2}^{2-x^2-y^2} (x^2 + y^2)^{3/2} dz dy dx$$

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6. (Example 13.7.4, covered in class) [16 points] Find the volume lying inside the sphere $x^2 + y^2 + z^2 = 2z$ and inside the cone $z^2 = x^2 + y^2$ using spherical coordinates.