Math 209

Assignment 4

Due: 12:00 noon on Thursday, October 13, 2005.

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1. Evaluate the double integral by first identifying it as the volume of a solid

$$\int\int_R (5-x)\,dA, \quad R = \{(x,y) \mid 0 \le x \le 5, 0 \le y \le 3\}.$$

2. Calculate the double integral

$$\int_1^4 \int_0^2 (x + \sqrt{y})\,dx\,dy.$$

3. Find the volume of the solid that lies under the hyperbolic paraboloid $z = 4+x^2-y^2$ and above the square $R = [-1,1] \times [0,2]$.

4. Find the average value of $f(x,y) = e^y\sqrt{x+e^y}$ over the rectangle $R = [0,4] \times [0,1]$.

5. Evaluate the iterated integral

$$\int_0^1 \int_x^{(2-x)} (x^2 - y)\,dy\,dx.$$

6. Evaluate the double integral over the domain D that is bounded by $y = \sqrt{x}$ and $y = x^2$ of

$$\int\int_D (x+y)\,dA.$$

7. Find the volume of a solid that is bounded by the planes $y = 0, z = 0, y = x$, and $6x + 2y + 3z = 6$.

8. Sketch the region of integration and change the order of integration for

$$\int_0^1 \int_{4x}^4 f(x,y)\,dy\,dx$$

9. Sketch the region of integration and change the order of integration for

$$\int_0^3 \int_0^{\sqrt{9-y^2}} g(x,y)\,dx\,dy.$$

10. Evaluate the integral by reversing the order of integration

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