Math V1202. Calculus IV, Section 004, Spring 2007

Practice Midterm 1

Problem 1. Evaluate $\iint_D y\, dA$, where D is the region in the first quadrant that is bounded by the lines $y = x$, $y = 2$ and the hyperbola $xy = 1$.

Problem 2. Evaluate the integral

$$\int_0^4 \int_{\sqrt{y}}^2 e^{x^3} dx dy.$$

Problem 3. Evaluate the integral

$$\iint_R \cos\left(\frac{y-x}{y+x}\right) dA,$$

where R is the triangular region with vertices $(2, 0)$, $(0, 2)$, and $(0, 0)$.

Problem 4. Evaluate

$$\iiint_E \frac{1}{x^2+y^2+z^2}\, dV,$$

where E is the region bounded by the spheres with center the origin and radii 1 and 3.

Problem 5. Evaluate $\iiint_E xz dV$, where E is bounded by the cylinder $x^2 + y^2 = 4$ and the planes $x = 0$, $y = 0$, $z = 0$, and $y = z$ in the first octant.

Problem 6. Find the volume of the solid E that lies above the cone $z = \sqrt{x^2 + y^2}$ and below the sphere $x^2 + y^2 + z^2 = 4$.

Problem 7. Find the area of the region inside the circle $r = 2\cos\theta$ and outside the circle $r = \sqrt{2}$.