

HOMEWORK 8, MATH 175 - FALL 2009

DUE MONDAY NOVEMBER 16TH (AT THE BEGINNING OF CLASS)

This homework assignment covers Sections 16.6-16.9 in the book.

1. Evaluate the triple integral $\iiint_E xy dV$ where E is bounded by the parabolic cylinders $y = x^2$ and $x = y^2$, and the planes $z = 0$ and $z = x + y$.
2. Find the volume of the solid enclosed by the paraboloid $x = y^2 + z^2$, and the plane $x = 16$.
3. Evaluate $\iiint_E x dV$, where E is enclosed by the planes $z = 0$ and $z = x + y + 5$ and by the cylinders $x^2 + y^2 = 4$ and $x^2 + y^2 = 9$.
4. Evaluate $\iiint_E e^{\sqrt{x^2+y^2+z^2}} dV$, where E is enclosed by the sphere $x^2 + y^2 + z^2 = 1$ in the first octant.
5. Find the volume of the solid that lies within the sphere $x^2 + y^2 + z^2 = 4$, above the xy -plane, and below the cone $z = \sqrt{x^2 + y^2}$.
6. Find the Jacobian of the transformation $x = e^{s+t}$, $y = e^{s-t}$.
7. Suppose S is the disk given by $u^2 + v^2 \leq 1$ and consider the transformation $x = au$, $y = bv$ where a and b are some fixed positive numbers. Find the image of the set S under this transformation.
8. Evaluate the integral $\iint_R x^2 dA$ where R is the region bounded by the ellipse $16x^2 + y^2 = 25$.
9. Evaluate the integral $\iint_R (x + y)e^{x^2 - y^2} dA$, where R is the rectangle enclosed by the lines $x - y = 0$, $x - y = 2$, $x + y = 0$, and $x + y = 3$.