

LB 220, Sections 001 & 002, Fall 2015
Homework 9 (due 11/20)

Instructions: Please write your solutions to the problems below on a clean piece of paper (not this piece of paper). Show the steps taken to arrive at each answer.

You may work with other students on homework problems. For this assignment, each student must submit his or her own solution to both problems. Both problems are actual exam problems from previous semesters.

1. Setup– BUT DO NOT EVALUATE– a triple integral IN CYLINDRICAL OR SPHERICAL COORDINATES (your choice) which computes the integral of $f(x, y, z) = z$ over the solid region which is enclosed by the hemisphere $z = \sqrt{1 - x^2 - y^2}$ and the cone $z = \frac{1}{\sqrt{3}}\sqrt{x^2 + y^2}$.
2. Let R be the bounded region in the plane bounded by the lines $x + y = 1$, $x + y = -1$, $-x + y = 1$, and $-x + y = -1$.

Consider the following change of variables: $u = x + y$, $v = -x + y$.

Use the change of variables to setup an double integral which is equal to $\iint_R (x^3 + y^5) dA$ expressed in terms of the new coordinates (u, v) .

DO NOT EVALUATE THE INTEGRAL.

