

Your name:

Instructor (please circle):

Barnett

Van Erp

Math 11 Fall 2010: written part of HW7 (due Wed Nov 10)

Please show your work. No credit is given for solutions without justification.

(1) [8 points]

- (a) Find $\iiint_E f \, dV$ where $f(x, y, z) = \sin z$ and E is the solid region lying in the first octant bounded by $z = 1 - x^2 - y^2$.

- (b) Find the *average value* of this function f over the solid region E

(2) [10 points] By converting to spherical coordinates, evaluate

$$\int_{-1}^1 \int_{-\sqrt{1-y^2}}^{\sqrt{1-y^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{2-x^2-y^2}} y \, dz \, dx \, dy$$

(3) [10 points] Let C be the union of the straight line starting at $(0,0)$ and ending at $(2,1)$ with the quarter circle from $(2,1)$ to $(3,0)$ with center $(2,0)$ traversed clockwise.

(a) Compute $\int_C xy \, ds$

(b) Compute $\int_C y \, dx - x \, dy$

(c) Describe how your answer to (a) and your answer to (b) would change if C were replaced with $-C$, that is, the same path traversed in the opposite sense.