

HW assignment 1

Due Wed Sept 9 at 7 p.m. by email to IBalitsk@odu.edu

Problem 1.

Calculate the curls of vector functions

(a) $\vec{v}_a = x^2\hat{e}_1 + 3xz^2\hat{e}_2 - 2xz\hat{e}_3$

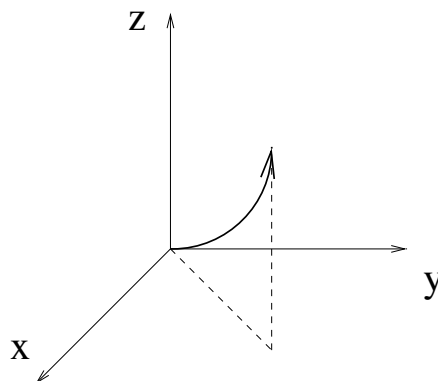
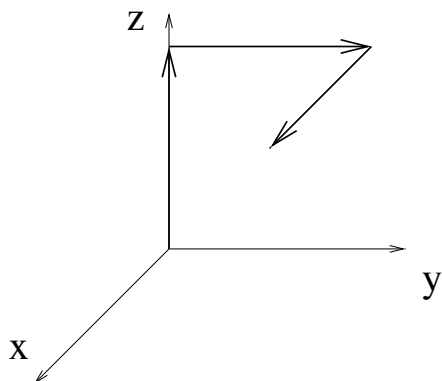
(b) $\vec{v}_b = xy\hat{e}_1 + 2yz\hat{e}_2 + 3xz\hat{e}_3$

Problem 2.

Check the fundamental theorem for gradients, using $T = x^2 + 4xy + 2yz^3$, the points $\vec{a} = (0, 0, 0)$, $\vec{b} = (1, 1, 1)$, and the two paths shown below:

(a) $(0,0,0) \rightarrow (0,0,1) \rightarrow (0,1,1) \rightarrow (1,1,1)$

(b) the parabolic path $x = y, z = x^2$.



Problem 3.

Check Stokes' theorem for the function $\vec{v} = xy\hat{e}_1 + 2yz\hat{e}_2 + 3xz\hat{e}_3$ using the triangular shaded area shown below

