Math 241, Sections BL1 and BL2

Quiz # 7

December 6, 2012

Solve both exercises. Show work to get credit.

1) [5pts.] Let $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ and $r = |\vec{r}|$. Find ∇r.

2) [5pts.] Compute the flux

$$\iint_S \vec{F} \cdot d\vec{S}$$

of the vector field $\vec{F}(x, y, z) = \langle x^4, -x^3z^2, 4xy^2z \rangle$ across the boundary S of the solid E bounded by the cylinder $x^2 + y^2 = 4$ and the planes $z = 0$ and $z = x + 7$, and oriented inward.