Exercise 7

If $\mathbf{r}$ is the position vector (with components x_1, x_2, x_3) and $\mathbf{v}$ is any vector, show that

(a) $(\nabla \cdot \mathbf{r}) = 3$

(b) $[\nabla \times \mathbf{r}] = 0$

(c) $[\mathbf{r} \times [\nabla \cdot \mathbf{vv}]] = [\nabla \cdot \mathbf{v}[\mathbf{r} \times \mathbf{v}]]$ (where $\mathbf{v}$ is a function of position)

[TYPO: 0 should be in bold, as the curl operator yields a vector, not a scalar.]