In the following $\mathbf{r}$ represent the position vector, $\mathbf{a} = (a_1, a_2, a_3)$ is a constant vector, $\mathbf{F} = (F_1, F_2, F_3)$ is a vector field and $f(x,y,z)$ is a scalar function. Show the following results.

Q1) $(\mathbf{a} \times \nabla) \times \mathbf{r} = -2 \mathbf{a}$.

Q2) $\text{curl(grad)f}(x,y,z) = 0$