

Math 302-123 Quiz 3A

Name:.....Sec#:.....ID#:.....Ser#:.....

Q:1 Let $\vec{r} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$ and $\vec{a} = a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}$ is a constant vector. Show that

(a) $\nabla \times [(\vec{r} \cdot \vec{r}) \vec{a}] = 2(\vec{r} \times \vec{a})$

(b) $\nabla \cdot [(\vec{r} \cdot \vec{r}) \vec{a}] = 2(\vec{r} \cdot \vec{a})$

Q:2 Find work done by the force $\vec{F} = (2xy - e^{3y})\mathbf{i} + (x^2 - 3xe^{3y})\mathbf{j}$ along the curve $y = x^4$ for $0 \leq x \leq 1$.