

Math 301-123 Quiz 2(A)

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

Q.1: Show that $(\vec{a} \times \nabla) \times \vec{r} = -2\vec{a}$, where $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ and $\vec{a} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$ is a constant vector.

Q.2: Find work done by the force $\vec{F} = 3xy\hat{i} - 4yz\hat{j} + 2xz^2\hat{k}$ acting along the curve

$$\vec{r}(t) = t^3\hat{i} + t^2\hat{j} + t\hat{k} \text{ from } t = 1 \text{ to } t = 2.$$

Q.3: Find a potential unction Φ and use it to evaluate the integral

$$\int_{(1,2)}^{(2,3)} (3x^2y + e^{2x})dx + (x^3 + y^2)dy.$$