Math 001D Assignment 16.2 Ans_____

Instructions: Write complete legible solutions to the following problems in the space provided. Be sure to supply all the necessary steps that lead to your answers

1. Evaluate the line integral

$\int_C 3x\,dx$, where C is the quarter circle $x^2 + y^2 = 4$, from $(2,0)$, to $(0,2)$

Ans_____

2. Evaluate the line integral Ans_____

$\int_C 4z\,ds$ where C is the line segment from $(1,0,1)$, to $(2,-2,2)$

3. Show that line integral is independent of the path and use a potential function to evaluate the integral

$\int_C (z^2 + 2xy)\,dx + (x^2)\,dy + (2xz)\,dz$, where C ms from $(2,1,3)$ to $(4,-1,0)$.

4. The base of a circular fence with radius 10 m is given by $x = 10\ \cos t,\ y = 10 \sin t$ The height of the fence at position (x, y) is given by the function

$$h(x,\ y) = 5 + 0.03(x^2 - y^2)$$

so the height varies from 2 m to 8 m. Suppose that 1 L of paint covers 100m^2. Determine how much paint you will need if you paint both sides of the fence.

5. Evaluate the line integral $\int_C \mathbf{F} \cdot d\mathbf{r}$, where C is given by the vector function **r**(t).

$$\mathbf{F}(x,y,z) = (x+y)\mathbf{i} + (y-z)\mathbf{j} + z^3\mathbf{k} \quad ,\mathbf{r}(t) = t^2\mathbf{i} + t^3\mathbf{j} + t^2\mathbf{k}, \quad 0 \le t \le 1$$