

Name Igwilo Tobioluwa  
Matric No 191eng02/024  
Dept Computer Eng

$$1) x = t, y = t^2, z = t^3$$

$$r = xi + yj + zk$$

$$r = ti + t^2j + t^3k$$

$$\frac{dr}{dt} = i + 2tj + 3t^2k$$

$$\left| \frac{dr}{dt} \right| = \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2 + \left(\frac{dz}{dt}\right)^2} = \sqrt{(1)^2 + (2)^2 + (3)^2} = \sqrt{14}$$

$$T(t) = \frac{\left(\frac{dr}{dt}\right)}{\left|\frac{dr}{dt}\right|} = \frac{i + 2tj + 3t^2k}{\sqrt{14}}$$

$$\text{Unit tangent at } t=1 \quad T(1) = \frac{i + 2(1)j + 3(1)^2k}{\sqrt{14}}$$

$$= \frac{i + 2j + 3k}{\sqrt{14}}$$

$$2) A = 4t^3i + 5k \quad B = 2t^2i + 4tj$$

$$C = \bar{A} \times \bar{B} = \begin{vmatrix} i & j & k \\ 0 & 4 & 5 \\ 2 & 4 & 0 \end{vmatrix}$$

$$C = i(0 - 20) - j(0 - 10) + k(0 - 8)$$

$$C = -20i + 10j - 8k$$

$$\therefore \int C dt = -20ti + 10tj - 8tk + c$$



$$\int_0^1 g(t) dt = [-20t + 10t^2 - 3t^3]_0^1$$

$$= [-20(1) + 10(1) - 3(1)] - [-20(0) + 10(0) - 3(0)]$$

$$= -13 - 0$$

$$= -13 \text{ square units}$$