

1) $x = t$

$y = t^2$

$z = t^3$

$r = ti + tj + t^3k$

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

when $t = 1$

~~$\left. \frac{dr}{dt} \right|_{t=1} = i + 2j + 3k$~~

$\left| \frac{dr}{dt} \right| = i + 2j + 3k$

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

$= \sqrt{1+4+9}$

$= \sqrt{14}$

$= 3.74$

$T = \frac{dr/dt}{|dr/dt|}$

$= \frac{i + 2j + 3k}{3.74}$

$= \frac{i}{3.74} + \frac{2j}{3.74} + \frac{3k}{3.74}$

$= \frac{i}{3.74} + \frac{2j}{3.74} + \frac{3k}{3.74}$

2) $A = 4t^3i + 5k$

$B = 26t^2j + 46j$

$C = A \times B$

$C = \begin{vmatrix} i & j & k \\ 0 & 46^3 & 5 \\ 26^2 & 46 & 0 \end{vmatrix}$

$C = i \begin{vmatrix} 46^3 & 5 \\ 46 & 0 \end{vmatrix} - j \begin{vmatrix} 0 & 5 \\ 26^2 & 6 \end{vmatrix} + k \begin{vmatrix} 0 & 46^3 \\ 26^2 & 46 \end{vmatrix}$

$C = i(0 - 206) - j(0 - 106^2) + k(0 - 86^5)$

$$G = -20t\mathbf{i} + 10t^2\mathbf{j} - 8t^3\mathbf{k}$$

$$\int G = \int -20t\mathbf{i} + 10t^2\mathbf{j} - 8t^3\mathbf{k} dt$$

$$= \left[\frac{-20t^2\mathbf{i}}{2} + \frac{10t^3\mathbf{j}}{3} - \frac{8t^4\mathbf{k}}{4} \right]$$

$$= \left[-10t^2\mathbf{i} + \frac{10t^3\mathbf{j}}{3} - \frac{4t^4\mathbf{k}}{3} \right]$$

$$= \left[-10(1)^2\mathbf{i} + \frac{10(1)^3\mathbf{j}}{3} - \frac{4(1)^4\mathbf{k}}{3} \right] - [0]$$

$$= -10\mathbf{i} + \frac{10}{3}\mathbf{j} - \frac{4}{3}\mathbf{k}$$

$$= -10\mathbf{i} + 3.33\mathbf{j} - 1.33\mathbf{k}$$