

Solve

$$A+C = 7i+2j+k$$

$$\underline{i+j+k}$$

$$8i+3j+0$$

$$B-A = 2i+j+4k$$

$$\underline{7i+2j-k}$$

$$-5i-j+5k$$

$j=2$

$$(A+C) \cdot (B-A) = 8i+3j+0$$

$$\underline{-5i-j+5k}$$

$$\underline{-40i-3j+51k}$$

5.  $x=t, y=t^2, z=t^3$  where  $t=1$

$$r = t + t^2 + t^3$$

$$\frac{dr}{dt} = 1 + 2t + 3t^2$$

$$\text{at } t=1$$

$$\frac{dr}{dt} = \cancel{1+2t+3t^2} i + 2j + 3k$$

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

$$\left| \frac{dr}{dt} \right| = \sqrt{1+4+9} = \sqrt{14} = 3.74$$

$$\therefore \hat{T} = \frac{1 + 2j + 3k}{3.74}$$



$$A \times (B \times C) = \begin{vmatrix} 1 & j & k \\ 1 & 2 & -4 \\ 5 & 6 & 8 \end{vmatrix}$$

$$= i \begin{vmatrix} 2 & -4 \\ 6 & 8 \end{vmatrix} - j \begin{vmatrix} 1 & -4 \\ 5 & 8 \end{vmatrix} + k \begin{vmatrix} 1 & 2 \\ 5 & 6 \end{vmatrix}$$

$$= i(16 - (-24)) - j(8 - (-20)) + k(6 - 10)$$

$$= i(40) - j(28) + k(-4)$$

$$= 40i - 28j - 4k$$

$$\textcircled{3} \quad R = 4 \sin 3t i + 4e^{3t} j + 7t^3 k$$

Solu:

$$\int R dt = \int (4 \sin 3t i + 4e^{3t} j + 7t^3 k) dt$$

$$= \int 4 \sin 3t dt + \int 4e^{3t} j dt + \int 7t^3 k dt$$

$$\int R dt = \frac{-4}{3} \cos 3t i + \frac{4}{3} e^{3t} j + \frac{7}{4} t^4 k + C$$

$$\textcircled{4} \quad A = 7i + 2j - k, B = 2i + j + 4k, C = i + j + k$$

find  $(A+C) \cdot (B-A)$



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MAT 102

①  $x = 7t^2, y = 6t^2 - 4t, z = t - 5$

Soln

$$r = 7t^2 i + (6t^2 - 4t)j + (t - 5)k$$

$$\frac{dr}{dt} = \underline{\underline{14t i + (12t - 4)j + (1)k}}$$

2.  $A = i + 2j - 4k, B = 2i - 3j + k, C = 4j - 3k$  find  $A \times (B \times C)$

Soln

$$B \times C = \begin{vmatrix} i & j & k \\ 2 & -3 & 1 \\ 0 & 4 & -3 \end{vmatrix}$$

$$= i \begin{vmatrix} -3 & 1 \\ 4 & -3 \end{vmatrix} - j \begin{vmatrix} 2 & 1 \\ 0 & -3 \end{vmatrix} + k \begin{vmatrix} 2 & -3 \\ 0 & 4 \end{vmatrix}$$

$$= i(9 - 4) - j(-6 - 0) + k(8 - 0)$$

$$= i(5) - j(-6) + k(8)$$

$$= 5i + 6j + 8k$$