

Kowaiye Oluwabukunmi Igedamola
19/Sci 17/007
Biotechnology
MAT102

$$\begin{aligned} 2 \quad (B \times C) &= \begin{vmatrix} i & j & k \\ 2 & -3 & 1 \\ 0 & 4 & -3 \end{vmatrix} \\ &= i \begin{vmatrix} -3 & 1 \\ 4 & -3 \end{vmatrix} - j \begin{vmatrix} 2 & 1 \\ 0 & -3 \end{vmatrix} + k \begin{vmatrix} 2 & -3 \\ 0 & 4 \end{vmatrix} \\ &= i(9-4) - j(-6-1) + k(8-0) \\ &= 5i + 7j + 8k \end{aligned}$$

$$\begin{aligned} A \times (B \times C) &= \begin{vmatrix} i & j & k \\ 1 & 2 & -4 \\ 5 & 7 & 8 \end{vmatrix} \\ &= i \begin{vmatrix} 2 & -4 \\ 7 & 8 \end{vmatrix} - j \begin{vmatrix} 1 & -4 \\ 5 & 8 \end{vmatrix} + k \begin{vmatrix} 1 & 2 \\ 5 & 7 \end{vmatrix} \\ &= i(16+28) - j(8+20) + k(7-10) \\ &= 44i - 28j - 3k \end{aligned}$$

1 The position vector: $r = xi + yj + zk$
 $r = i(7t^2) + j(6t^2 + 4t) + k(t-5)$

$$\text{Velocity} = \frac{dr}{dt}$$

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

5 $T = \frac{dr}{dt}$

$$\left| \frac{dr}{dt} \right|$$

19/Sci 17/007

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

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

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

$$= i + 2j + 3k$$

$$= \sqrt{1^2 + 2^2 + 3^2}$$

$$= \sqrt{14} \text{ or } 3.74$$

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

$$4 (7i + i + 2j + j - k + k) \cdot (2i - i + j - j + 4k - k)$$

$$(8i + 3j) \cdot (i + 3k)$$