

$$2) \quad x = -3t^2 \quad y = t^2 \quad z = 4t^3$$

differentiate $(-3t, t^2, 4t^3)$

$$v = (-3, 3t^2, 12t^2)$$

Divide the Vector by its Magnitude

$$m = \sqrt{(-3)^2 + (3t)^2 + (12t)^2} = \sqrt{9 + 6t^2 + 24t^2}$$

$$\frac{dv}{dt} = \frac{1}{\sqrt{9 + 6t + 24t^2}} (-3, 3t^2, 12t^2)$$

add to 1 to the equation

$$T(t) = \frac{1}{\sqrt{9 + 6 + 24}} (-3, 3, 12)$$

$$\left(\frac{-3}{\sqrt{39}}, \frac{3}{\sqrt{39}}, \frac{12}{\sqrt{39}} \right) //$$

$$3) \quad x = 8t^2, \quad y = t^2 - 4t, \quad z = t + 1 \quad \text{find acceleration}$$

$$\text{Velocity} = \frac{dv}{dt} = 16ti + (2t - 4)j + 1k$$

$$\frac{d^2v}{dt^2} = \text{Acceleration} = 16i + 2j + 0k //$$

No. 3

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- 1) If $A = 5i - 7j - 6k$, $B = j + 4k$, $C = 9i - 4j + k$
find $-8(A+B) \cdot (C-A)$

$$\begin{aligned} -8(A+B) &= -8(5i - 7j - 6k) + (j + 4k) \\ &= -8(5i + 0j - 6k) + (-7j + 4k) \\ &= -8(5i - 7j - 2k) \\ &= (-40i + 48j + 16k) \end{aligned}$$

No. 1

$$\begin{aligned} (C-A) &= (9i - 4j + k) + (5i - 7j - 6k) \\ &= (9+5)i + (-4-7)j + (1-6)k \\ &= (14i - 11j - 5k) \end{aligned}$$

$$-8(A+B) \cdot (C-A) = \begin{vmatrix} i & j & k \\ -40 & 48 & 16 \\ 14 & -11 & -5 \end{vmatrix}$$

$$= i \begin{vmatrix} 48 & 16 \\ 3 & 7 \end{vmatrix} - j \begin{vmatrix} -40 & 16 \\ 4 & 7 \end{vmatrix} + k \begin{vmatrix} -40 & 48 \\ 4 & 3 \end{vmatrix}$$

$$\begin{aligned} &= (336 - 48)i - (-280 - 64)j + (-120 - 192)k \\ &= 288i + 344j - 312k \end{aligned}$$

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

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

$$= i(2 - 12) - j(1 + 8) + k(-3 - 4)$$

No. 4

$$= -10i - 9j - 7k$$

$$= -10i - 9j - 7k$$

$$(A \times B) \times C = \begin{vmatrix} i & j & k \\ -10 & -9 & -7 \\ 1 & 4 & -3 \end{vmatrix} = \begin{vmatrix} i & j & k \\ -10 & -9 & -7 \\ 1 & 4 & -3 \end{vmatrix}$$

$$= i \begin{vmatrix} -9 & -3 \\ -7 & 4 \end{vmatrix} - j \begin{vmatrix} -10 & -7 \\ 1 & -3 \end{vmatrix} + k \begin{vmatrix} -10 & -9 \\ 1 & 4 \end{vmatrix}$$

$$= i(-36 - 21) - j(30 + 7) + k(-40 - 9)$$

$$= -67i - 37j - 49k$$

$$= -67i - 37j - 49k$$

$$R = 4 \sin 3t i + 4e^{2t} j + 7t^3 k$$

$$\int_0^1 R = \int_0^1 4 \sin 3t i + \int_0^1 4e^{2t} j + \int_0^1 7t^3 k$$

No. 5

$$\left[-\frac{4}{3} \cos 3t i + \frac{4}{3} e^{3t} j + \frac{7}{4} t^4 k \right]_{t=0}^1$$

$$= \frac{-4}{3} \cos 3(1) i + \frac{4}{3} e^{3(1)} j + \frac{7}{4} (1)^4 k \quad \text{where } t=1$$

$$= -1.33i + 10.39j + 1.75k$$

when $t=0$

$$\frac{-4}{3} \cos 3(0) i + \frac{4}{3} e^{3(0)} j + \frac{7}{4} (0)^4 k$$

$$= -1.33i$$

$$\therefore [-1.33i + 10.87j + 1.75k] - [-1.33i]$$

$$= 10.87j + 1.75k //$$

No.5