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19/SCI18/001
Architecture

1. $A = 5i - 7j - 6k$

$B = j + 4k$

$C = 9i - 4j + k$

-8 $(A + B) \cdot (C - A)$

$A + B = 5i - 7j - 6k + j + 4k$

$= 5i - 6j - 2k$

$C - A = 9i - 4j + k - (5i - 7j - 6k)$

$= 4i + 11j + 7k$

$-8 (5i - 6j - 2k) * (4i + j + 7k)$

$-40i + 48j - 16k \cdot (4i + j + 7k)$

$-160i\ 48j * -112k$ //

3 A particle moves along a curve, $x = -8t^2$
$y = t^2 - 4t$, $z = t + 1$ where t is time
Find its acceleration

$$\text{acceleration} = \frac{\Delta v}{t}$$

since we are dealing with position vectors
let $P(x, y, z)$ be any point on the
given curve and $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ be
the position vector of P relative to O
as the origin
substituting x, y, z in $\vec{r}$
we have $\vec{r} = (-8t^2)\hat{i} + (t^2 - 4t)\hat{j} + (t+1)\hat{k}$
so acceleration vector $\vec{a}$
will be differential of $\vec{r}$ in
respect to t

$$\vec{a} = \frac{d\vec{r}}{dt} = 16t^{2-1}\hat{i} + (2t - 4t)\hat{j}$$
$$\hat{k}$$

$$\vec{a} = \frac{d\vec{r}}{dt} = 16t\hat{i} + (2t - 4)\hat{j} + \hat{k}$$

Date: .....

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

$B = 2i - 3j + k$

$C = 4j - 3k$

$(A \times B) \times C$

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

$= (2i - 6j - 4k) \times (4j - 3k)$

$= -24j + 12k$ //

5. $R = 4\sin 3ti + 4e^{3t}j + 7t^3k$ Find the integral of R with respect to t from a to 1

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

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