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MAT 102
Architecture.

1 $A = 5i - 7j - 6k$
$B = j + 4k$
$C = 9i + 4j + k$
$-8\,(A+B)\cdot(C-A)$
$A+B = 5i - 7j - 6k + j + 4k$
$= 5i - 6j - 2k$
$C-A = 4i - j + 7k$
$-8(5i - 6j - 2k) * (4i + j + 7k)$
$= -160i\ 48j - 112k$

2

3 Acceleration $= \frac{\Delta v}{\Delta t}$

Since we are dealing with position vectors let $P(x, y, z)$ be any point on the 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 $r = (-8t^3)\hat{i} + (t^2)\hat{j} + (1+t)\hat{k}$

$\therefore\ \vec{a} = \frac{dr}{dt} = 16t\hat{i} + 2t - 4t + \hat{k}$

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

$B = 2i - 3j + k$

$C = 4j - 3k$

$(A \times B)(\cancel{A \times C})$

$(A \times B) = (1 + 2j + 4k \times 2i - 3j + k)$

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

$= -24j + 12k$

5 $R = 4 \sin 3t i + 4e^{3t} j + 7t^3 k$

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

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