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19/ENG04/051
Serial Number : 117

(i) velocity ~~range~~ alonge curve x

$x = 8t^3$

$x = 8(3)t^2$

$x = 24t^2$

(ii) Acceleration

$x = 24t^2$

$x = 48t$

$y = 4t^3 - 7t$

velocity along curve y

$y = 4t^3 - 7t$

$y = 4(3)t^3 - 7t$

$y = 12t^2 - 7$

acceleration

$y = 12t^2 - 7$

~~$y = 12(2t$~~ $y = 12(2)t - 7$

$y = 24t$

velocity ; $z = t + 3$

$z = 1$

acceleration ; $z = 1$

$z = 0$

(2) Given

$F(t) = 3t(i)\,t^3(j) + t^2(k)$ at $t = 1$

Tangent vector $= \vec{F}'(t) = 3(i) + 3t^2(j) + 2t(k)$

$\vec{F}'(1) = 3(i) + 3(1)^2 + 2(1)(k)$

$\vec{F}'(1) = 3i + 3j + 2k$

Tangent vector $= \langle 3, 3, 2 \rangle$

Finding the unit tangent vector

we have $= V/|V|$

Magnitude/length $= \sqrt{3^2+3^2+2^2}$

$= \sqrt{9+9+4}$

$= \sqrt{22}$

with tangent vector $= \dfrac{\langle 3, 3, 2 \rangle}{\sqrt{22}}$

by splitting $= \dfrac{3}{\sqrt{22}}, \dfrac{3}{\sqrt{22}}, \dfrac{2}{\sqrt{22}}$

using rationalization, we have

$3/\sqrt{22} \times \sqrt{22}/\sqrt{22},\ 3/\sqrt{22} \times \sqrt{22}/\sqrt{22},\ 2/\sqrt{22} \times \sqrt{22}/\sqrt{22}$

$= \dfrac{3\sqrt{22}}{22}, \dfrac{3\sqrt{22}}{22}, \dfrac{2\sqrt{22}}{22}$ //