

$$(6b) \quad \vec{r} = \langle \sin(t), \cos(t), 1 \rangle$$

$$\vec{p} = m \vec{v} = 2 \frac{d\vec{r}}{dt} = 2 \langle \cos(t), -\sin(t), 0 \rangle$$

$$= \langle 2\cos(t), -2\sin(t), 0 \rangle$$

$$\vec{L} = \vec{r} \times \vec{p} \quad \text{h of } m/\text{s}$$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \sin(t) & \cos(t) & 1 \\ 2\cos(t) & -2\sin(t) & 0 \end{vmatrix}$$

$$= (0 + 2\sin(t)) \hat{i} - (0 - 2\cos(t)) \hat{j} + (-2\sin^2(t) - 2\cos^2(t)) \hat{k}$$

$$\langle 2\sin(t), 2\cos(t), -2 \rangle$$

$$\text{h of } m^2/\text{s}$$

$$\vec{\tau} = \vec{r} \times \vec{F}$$

$$\vec{p} = m\vec{v}$$

$$\vec{F} = \frac{d\vec{p}}{dt} = m \frac{d\vec{v}}{dt}$$

$$\vec{F} = \frac{d\vec{p}}{dt}$$

$$= \frac{d}{dt} \langle 2\cos(t), -2\sin(t), 0 \rangle$$

$$= \langle -2\sin(t), -2\cos(t), 0 \rangle$$

kg m/s²
N

$$\vec{T} = \vec{r} \times \vec{F}$$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \sin(t) & \cos(t) & 1 \\ -2\sin(t) & -2\cos(t) & 0 \end{vmatrix}$$

$$= (0 + 2\cos(t))\hat{i} - (0 + 2\sin(t))\hat{j} + (0)\hat{k}$$

$$\langle 2\cos(t), -2\sin(t), 0 \rangle \text{ Nm}$$

$$\vec{T}\left(\frac{\pi}{2}\right) = \langle 0, -2, 0 \rangle \text{ Nm}$$

$$-2\hat{j} \text{ N-m}$$