

IKEH MARK CHIMKA

~~ASB~~

①

$$\textcircled{a} \quad \frac{dF}{dx} = 2xi (3i)_j + \cos x k$$

$$\therefore \frac{dF}{dx} = 2xi + 3j + \cos x k$$

$$\textcircled{b} \quad \frac{d^2F}{dx^2} = 2i - \sin x k$$

$$\textcircled{c} \quad \left| \frac{dF}{dx} \right| = \sqrt{(2x)^2 + (3)^2 + (\cos x)^2}$$

$$= \sqrt{4x^2 + 9 + \cos^2 x}$$

$$\text{At } x = 1 = \sqrt{4(1)^2 + 9(\cos^2(1))}$$

$$= \sqrt{4 + 9 + 0.999} = \sqrt{13.999}$$

$$= 3.74$$

$$\textcircled{d} \quad \frac{d}{dx} (F \cdot F) = (F \cdot F)' = [(x^2 i) + (3x+2) j + \sin x k] \cdot$$

$$[(x^2 i) + (3x+2) j + \sin x k]$$

$$= x^4 + (9x^2 + 6x + 6x + 4) + \sin^2 x$$

$$= x^4 + 9x^2 + 12x + 4 + \sin^2 x$$

$$\therefore \frac{d}{dx} (F \cdot F) = 4x^3 + 18x + 12$$

$$+ 2 \sin x \cos x$$

$$\frac{d}{dx} (F \cdot F) = 4(1)^3 + 18(1) +$$

$$12 + 2 \sin(1) \cos(1)$$

$$= 4 + 18 + 12 + 2(0.175)(0.99)$$

$$= 4 + 18 + 12 + 0.035$$

$$= 34.035$$



$$\textcircled{a} \quad \frac{dr}{dt} = (2t + 3)\hat{i} - 6\cos 3t\hat{j} + 6e^{2t}\hat{k}$$

$$\textcircled{b} \quad \frac{d^2r}{dt^2} = 2\hat{i} + 18\sin 3t\hat{j} + 12e^{2t}\hat{k}$$

$$\textcircled{c} \quad \left| \frac{d^2r}{dt^2} \right| = 2\hat{i} + [18\hat{j} (3)(0)]$$