

Donor's Name 0

1/1/2016

Level Business

Assignment 2

1) Given that

$$P = 2x^2 + (3\cos 2x) + \sin x \text{ find}$$

$$\frac{dP}{dx} = 2 \cdot 2x + 3(-\sin 2x) + \cos x$$

$$\text{at } x=1$$

$$\frac{dP}{dx} = 2(1) + 3(-\sin(2)) + \cos(1)$$

$$\frac{dP}{dx} = 1$$

$$= 2 + 3(-0.9093) + 0.7071$$

$$b) \frac{d^2P}{dx^2} = 2 - \sin 2x + \cos x$$

$$\text{at } x=1$$

$$\frac{d^2P}{dx^2} = 2 - \sin(2) + \cos(1)$$

$$\frac{d^2P}{dx^2} = 2 - 0.9093 + 0.7071$$

$$c) \left| \frac{dP}{dx} \right| = 2 + 3(-0.9093) + 0.7071$$

$$= \sqrt{2^2 + 3^2 + 0.998^2}$$

$$= 3.74$$

$$d) \frac{d}{dx} (P \cdot f)$$

$$F.P = (x^2 i + (3x+2) j + \sin 2k) \cdot (x^2 i + (3x+2) j + \sin 2k)$$

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

Note  $i \cdot i = 1$

$$j \cdot j = 0$$

$$k \cdot k = 1$$

$$i \cdot k = 0$$

$$j \cdot k = 0$$

$$i \cdot j = 0$$

$$\frac{d(F.P)}{dx} = 4x^3 + 18x + 12 + 2 \sin 2 \cos 2$$

$$at \ x = 1$$

$$\frac{d(F.P)}{dx} = 4(1)^3 + 18(1) + 12 + 2 \sin 2 \cos 2$$

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

$$= 34.035$$

$$2) \ r = (t^2 + 3t) i - 2 \sin 3t j + 3e^{2t} k$$

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

$$b) \frac{d^2r}{dt^2} = 2i + (-18 \sin 3t) j + 12e^{2t} k$$

$$c) \frac{d^2 r}{dt^2} \text{ at } h=0$$

$$\frac{d^2 r}{dt^2} = 2i + 12k$$

$$\left| \frac{d^2 r}{dt^2} \right| = \sqrt{2^2 + 0^2 + 12^2}$$

$$= 12.12 \text{ m/s}^2$$