

Bella Hancock

Elect Elect

18/ENH04/023

(12-3)  $v = (4t - 3t^2)$   
 recall  $ds = v dt$

$$\int_0^4 (4t - 3t^2) dt$$

$$s = (2t^2 - t^3) \Big|_0^4$$

$$s = 2(4)^2 - (4)^3 = +32 - 64 = -32 \text{ m}$$

(12-4)

$$v = 0.5t^3 - 8t$$

$$a = ? \text{ if } t = 2 \text{ s}$$

$$a = \frac{d}{dt} (0.5t^3 - 8t)$$

$$a = 1.5t^2 - 8$$

$$\therefore @ t = 2$$

~~a t~~

$$a = 1.5(2^2) - 8 = -2 \text{ m/s}^2$$

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

(12-7)  $a = (4t^2 - 2)$

$$\therefore v = \int (4t^2 - 2) dt$$

$$v = \frac{4}{3}t^3 - 2t + C_1$$

$$s = \int (\frac{4}{3}t^3 - 2t + C_1) dt$$

$$s = \frac{1}{3}t^4 - \frac{2}{2}t^2 + C_1t + C_2 \quad (2-2)$$

$$@ t = 0, s = -2$$

$$\text{sub in eqn 2} \therefore C_2 = -2$$

$$@ t = 2, s = -20 \therefore C_1 = -9.70$$

$$\text{at } t = 4$$

$$\text{sub in eqn 2}$$

$$s = \frac{1}{3}(4)^4 - (4)^2 + (-9.70)(4) + (-2)$$

$$= 28.7 \text{ m}$$

(12-8) recalling  $dt = \frac{dv}{a}$

$$v = (20 - 0.05s^2) \text{ m/s}$$

$$\therefore \frac{ds}{v} = \frac{dv}{a} \quad \therefore a = v \frac{dv}{ds}$$

$$dv = -2(0.05s) ds$$

$$\therefore dv = -0.1s ds$$

$$\therefore a = \frac{(20 - 0.05s^2)(-0.1s) ds}{ds}$$

$$a = -2s + 0.005s^3$$

$$\therefore @ s = 15 \text{ m}$$

$$a = -2(15) + 0.005(15^3)$$

$$= -13.125 \text{ m/s}^2 \quad = 13.125 \text{ m/s}^2$$