

Njoku Victory

DATE

18/ENG04/183

Elect - Elect

Mechanics

$$DV = 4t - 3t^2 \text{ m/s}$$

$$s = \int v dt$$

$$s = \int (4t - 3t^2) dt$$
$$= 2t^2 - t^3$$

when  $t = 4s$

$$s = 2(4)^2 - (4)^3$$

$$= 32 - 64$$

$$s = -32m$$

$$2) v = 0.5t^3 - 8t \text{ m/s}$$

$$a = \frac{dv}{dt}$$

$$\frac{dv}{dt} = 3(0.5)t^2 - 8$$

$$= 1.5t^2 - 8$$

When  $t = 2s$

$$a = 1.5(2)^2 - 8$$

$$a = 6 - 8$$

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

$$3) a = 4t^2 - 2 \text{ m/s}^2$$

$$v = \int a dt$$

$$v = \int 4t^2 - 2$$

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



$$s = \int v dt$$

$$s = \int \frac{4t^3}{3} - 2t dt$$

$$s = \frac{4t^4}{12} - \frac{2t^2}{2} + (t + k)$$

$$s = \frac{t^4}{3} - t^2 + Ct + k$$

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

$$-2 = \frac{(0)^4}{3} - (0)^2 + C(0) + k$$

$$k = -2$$

When  $t=2$ ,  $s = 20 - 20$

$$-20 = \frac{(2)^4}{3} - (2)^2 + C(2) - 2$$

$$-20 = -0.7 + 2C$$

$$C = -9.7$$

$$s = \frac{t^4}{3} - t^2 - 9.7t - 2$$

When  $t=4$

$$s = \frac{(4)^4}{3} - 4^2 - 9.7(4) - 2$$

$$s = 28.7 \text{ m}$$

4)  $V = 20 - 0.55 \text{ m/s}$

$$\frac{dt}{dv} = \frac{ds}{v} \quad \frac{v}{ds} = \frac{dv}{dt}$$

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$$r = \frac{dv}{dt}$$

$$\frac{dv}{dt} = \frac{dv}{ds} \cdot \frac{ds}{dt}$$

$$\frac{dv}{ds} = -0.1s$$

$$\frac{ds}{dt} = v = 20 - 0.5s^2$$

$$r = (-0.1s)(20 - 0.05s^2)$$

When  $s = 15$ 

$$r = (-0.1 \times 15)(20 - 0.05(15)^2)$$

$$r = -13.13 \text{ m/s}^2$$