

ADD MATHS FINAL ASSESSMENT

a) $v = -t^3 + 6t - 5$

when $t=0$ $s=0$,

$$s = \int v \, dt$$

$$0 = -\frac{1}{3}(0)^3 + 3(0)^2 - 5(0) + C$$

$$C = 0$$

$$s = \int (-t^3 + 6t - 5) \, dt$$

$$= -\frac{1}{4}t^4 + 3t^2 - 5t + C$$

When $v=12$,

$$s = -\frac{1}{3}(7)^3 + 3(7)^2 - 5(7)$$

$$-12 = t^3 - 6t + 5$$

$$= -\frac{7}{3}$$

$$-t^3 + 6t + 7 = 0$$

$$t^3 - 6t - 7 = 0$$

$$t = 1 \text{ or } t = 7$$

(rejected)

b) $-t^2 + 6t - 5 = 0$

$$\frac{dv}{dt} = -2t + 6$$

$$(-t+5)(t-1) = 0$$

$$t = 5 \text{ or } t = 1$$

when $t=5$, $-2(5)+6 = -4$

max displacement is $s = -\frac{1}{3}(5)^3 + 3(5)^2 - 5(5)$

when $t=1$

$$= \frac{25}{3}$$

when $t=1$, $-2(1)+6 = 4$

1/c) when $t=0$, $s=0$

when $t=1$, $s = -\frac{1}{3}(1)^3 + 3(1)^2 - 5(1) = -\frac{7}{3}$

when $t=2$, $s = -\frac{1}{3}(2)^3 + 3(2)^2 - 5(2) = -\frac{2}{3}$

