

$$0 \leq t \leq 5$$

$$\int_0^5 v \, dt = \int_0^5 300 \, dt$$

$$s = 15t^2 \Big|_0^5$$

$$s = 15(5)^2 - 15(0)^2$$

$$s = 15 \times 25$$

$$s = 375 \text{ m}$$

$$5 \leq t \leq 15$$

$$v = -15t + 225$$

$$\int_{375}^s v \, dt = \int_5^s (-15t + 225) \, dt$$

$$s - 375 = -\frac{15t^2}{2} + 225t \Big|_5^s$$

$$s - 375 = \left[\frac{-15(s^2)}{2} + 225(s) \right] - \left[\frac{-15(5)^2}{2} + 225(5) \right]$$

$$s - 375 = \left[\frac{-15 \times 225 + 3375}{2} \right] - \left[\frac{-15 \times 25 + 1125}{2} \right]$$

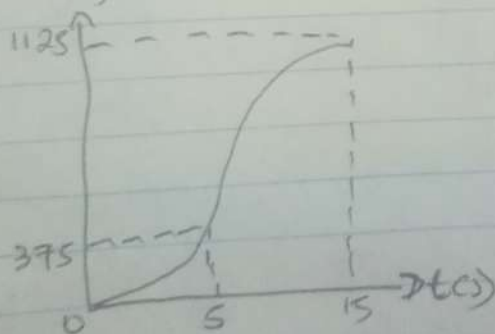
$$s - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$$

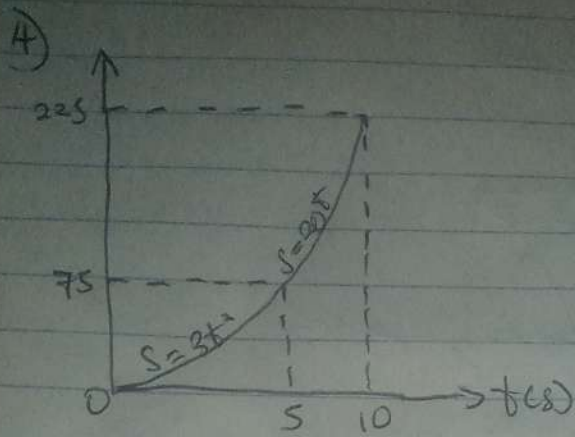
$$s - 375 = +1687.5 - 937.5$$

$$s - 375 = 750$$

$$s = 1125 \text{ m}$$

S-t graph
s(m)





(1)

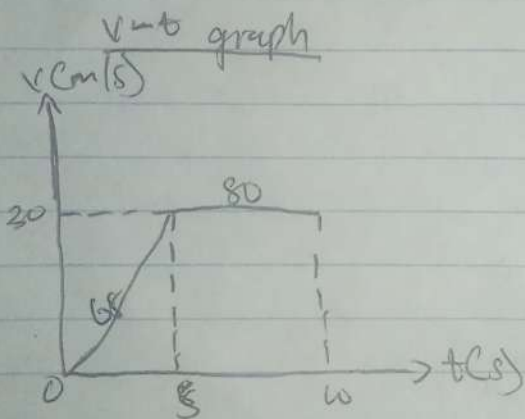
$$v = \frac{ds}{dt}$$

at $t = 5s$

$$v = 6t = 6 \times 5 = 30 \text{ m/s}$$

at $t = 10s$

$$v = 30 \text{ m/s}$$



(2)

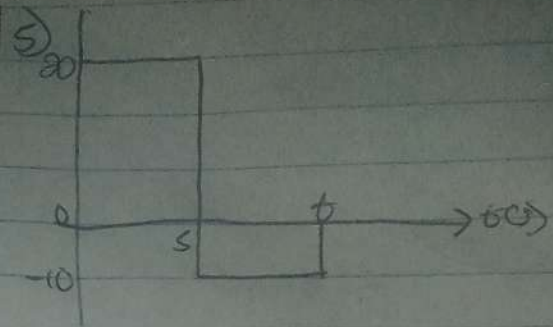
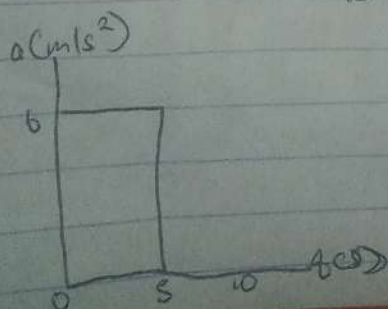
$$a = \frac{dv}{dt}$$

at $t = 5s$

$$a = 6 \text{ m/s}^2$$

at $t = 10s$

$$a = 0 \text{ m/s}^2$$



(1)

$$v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20t$$

at $t = 5s$

$$v = 20 \times 5 = 100 \text{ m/s}$$

$5s < t \leq 10s$

$$\int_{100}^v dv = \int_{5}^{t} -10 dt$$

$$v - 100 = -10t + 50$$

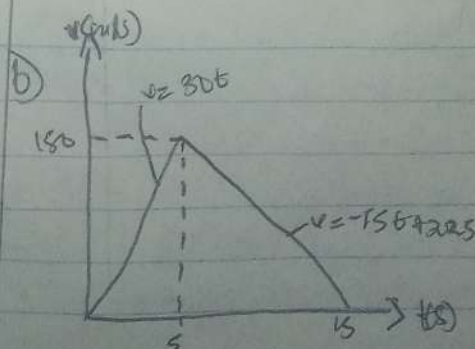
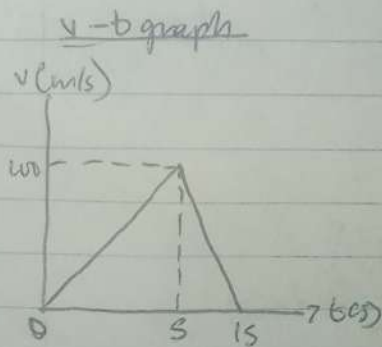
$$v = 100 - 10t + 50$$

at $t', v = 0$

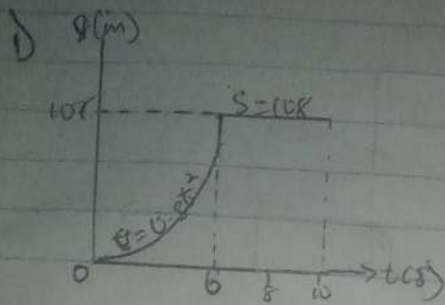
$$0 - 100 = -10t' + 50$$

$$10t' = 150$$

$$t' = 15s$$



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$$v = \frac{dy}{dt}$$

$$v = 1.5t^2$$

$$\text{at } t = 6s$$

$$v = 1.5 \times 6^2$$

$$= 1.5 \times 36$$

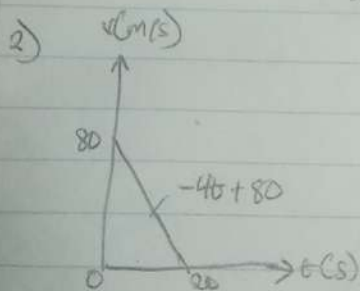
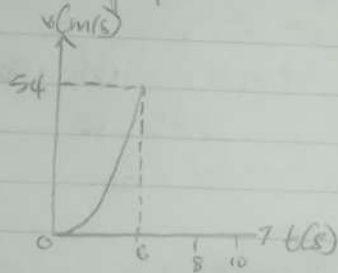
$$v = 54 \text{ m/s}$$

$$\text{from } t = 6s \text{ to } 10s \Rightarrow v = 0$$

$$\therefore v = 0$$

∴

$v-t$ graph



3) $s = \int v dt$

$$s = \int (-4t + 80) dt$$

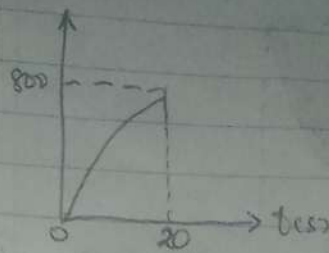
$$s = -2t^2 + 80t$$

at $t = 20s$

$$s = -2(20)^2 + 80(20)$$

$$s = 1600 - 800 = 800 \text{ m}$$

$s-t$ graph



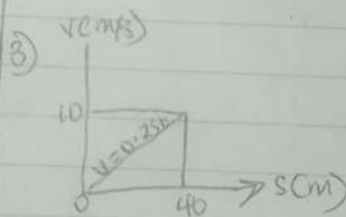
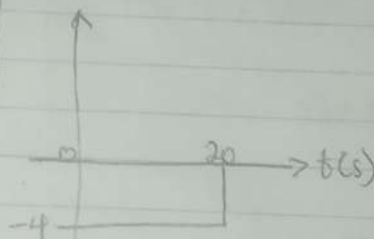
10) acceleration

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

$$\therefore a = -4 \text{ m/s}^2$$

$$\text{at } t = 20s, a = -4 \text{ m/s}^2$$

$a-t$ graph



$$a = \left(\frac{dv}{ds} \right) v$$

$$v = 0.25s$$

$$a = 10 \times \frac{d(0.25s)}{ds}$$

$$a = 10 \times 0.25$$

$$a = 2.5 \text{ m/s}^2$$

$a-s$ graph

