

* Allah-christian Attahuwima

* 1812N9036017

* civil-Engineering

1. $S = 0.5t^3 \text{ m}$

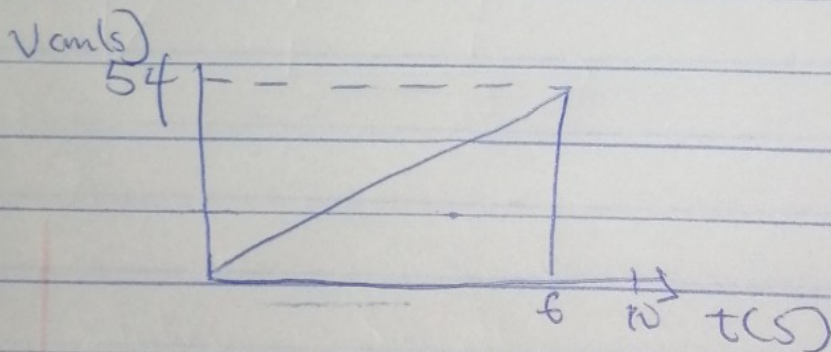
$$V = ds/dt = 1.5t^2 \text{ m/s}$$

① $t = 6$

$$V = 1.5(6)^2 = 54 \text{ m/s}$$

$$S_2 = 108$$

$$V = ds/dt ; v = 0 \text{ m/s}$$



2. $V = -4t + 80$

$$a = dv/dt = -4 \text{ m/s}^2 ; @ t = 20 \quad a = 4 \text{ m/s}^2$$

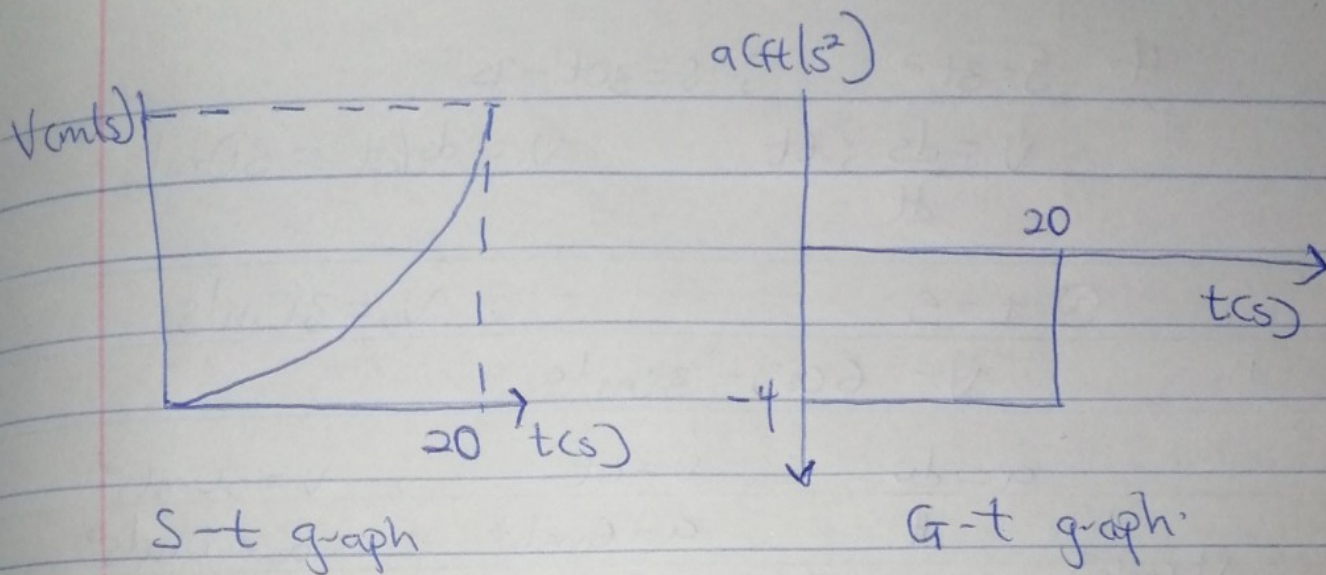
$$S = \int v dt ; \int (-4t + 80) dt$$

$$S = (-2t^2 + 80t) -$$

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

$$S = 800 \text{ m}$$

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8.

$$V = 0.25s$$

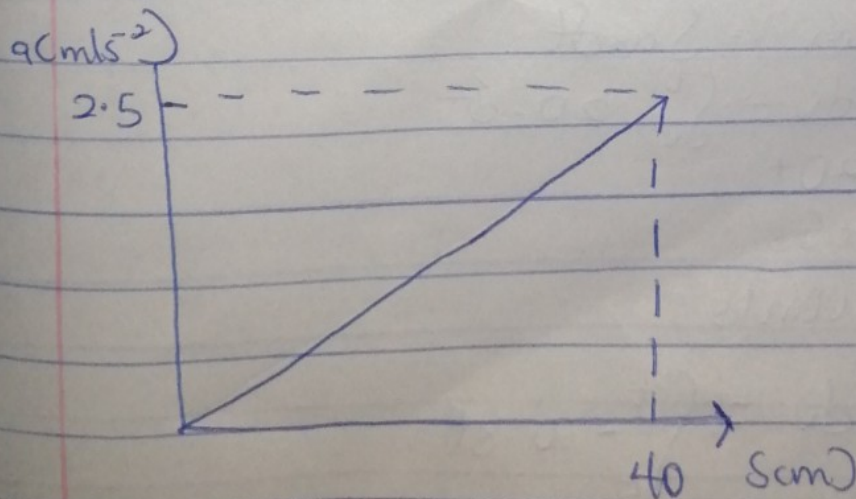
$$a = V \left(\frac{dV}{ds} \right); a = 0.25s (0.25)$$

$$a = (0.0625s) \text{ m/s}^2$$

$$a = 40 \text{ m}$$

$$a = (0.0625(40))$$

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



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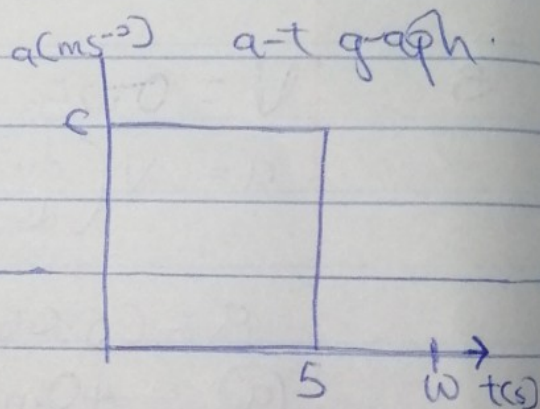
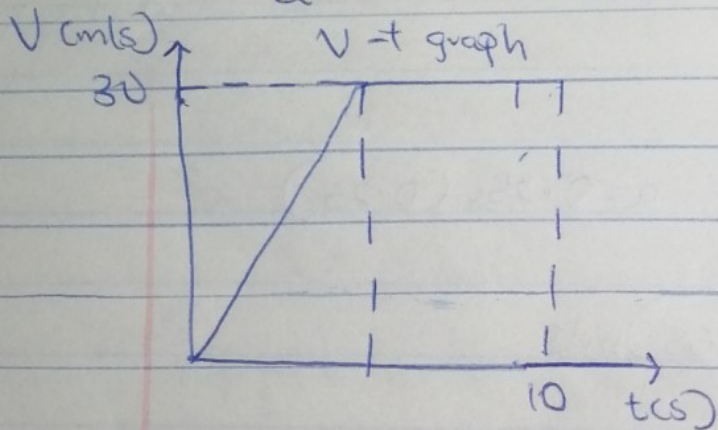
$$4. \quad s = 3t^2 \quad ; \quad s = 30t - 75$$
$$v = \frac{ds}{dt} ; 6t \quad \quad v = \frac{ds}{dt} = 30 \text{ m/s}$$

@ $t = 5$

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

$$v = 6(5) = 30 \text{ m/s}$$

$$a = \frac{dv}{dt} \quad ; \quad v = 6t \quad ; \quad v = 30 \text{ m/s}^2$$
$$a = 6 \text{ m/s}^2 \quad \quad a = 0 \text{ m/s}^2$$



5. $a = 20 \text{ m/s}^2$ $a = -10 \text{ m/s}^2$

Solution = $\int a \cdot dt$

$$\int_0^v dv = \int_0^t 20 \cdot dt$$

$$v = 20t$$

@ $t = 5s$

$$v = 100 \text{ m/s}$$

$$\int_{100}^v dv = \int_5^t -10 \cdot dt$$

$$v = 100 = -10(t-5)$$

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

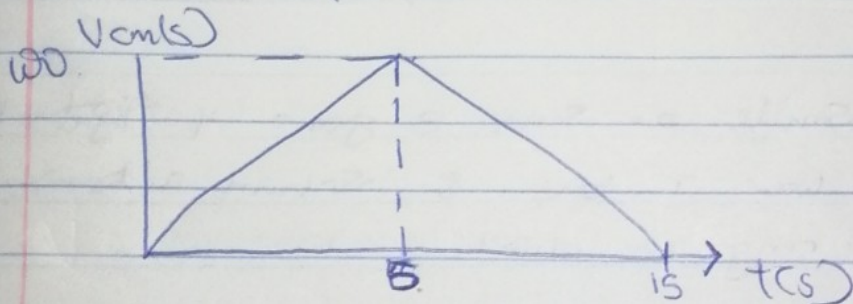
$$v = (-10t + 150) \text{ m/s}$$

$$\textcircled{a} v = 0$$

$$0 = -10t + 150$$

$$-150 = -10t$$

$$t = 15 \text{ s (for car to come to rest)}$$



$$6 \quad v = 30t$$

$$s = \int v dt = (15t^2)$$

$$\textcircled{a} t = 5$$

$$15(5)^2$$

$$= 375 \text{ m}$$

$$v = -15t + 225$$

$$s = \int v dt = -7.5t^2 + 225t$$

$$\textcircled{a} t = t_2 - t_1 = 15 - 5 = 10$$

$$\textcircled{a} t = 10$$

$$-7.5(10)^2 + (225)(10)$$

$$= 1500 \text{ m}$$

\therefore total distance travelled

$$375 + 1500 = 1875 \text{ m}$$

