1.) Given that:

$S = 0.5t^3$ m.

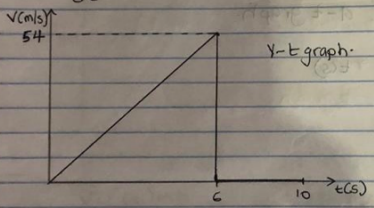
$v = \frac{ds}{dt}$, $v_1 = 1.5t^2$

So at $t = 6$

$v = 1.5(6)^2 = 54$ m/s.

$S_2 = 108$m.

$v = \frac{ds}{dt} = 0$, $v = 0$ m/s.



v-t graph.

2.) Given that

$v = -4t + 80$

$S = \int v\,dt$

$S = \int_0^{20} -4t + 80\,dt$

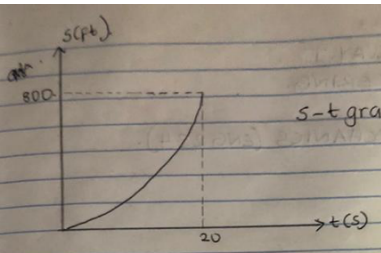
$S = [-2t^2 + 80t]\Big|_0^{20}$

$\therefore$ at $t = 20$

$S = [-2(20)^2 + 80(20)]$

$S = -800 + 1600$

$S = 800$ ft.

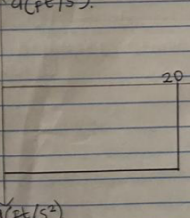


s-t graph.

$v = (-4t + 80)$ ft/s.

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

$a = -4$ ft/s^2



a-t graph.

3.) $v = (0.25S)$ m/s.

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

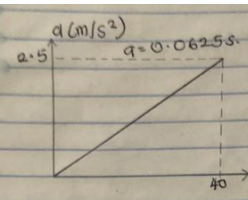
$a = 0.25S(0.25)$

$a = (0.0625S)$ m/s^2

At $S = 40$m

$a = (0.0625 \times 40)$

$a = 2.5$ m/s^2.



a-s graph.

4.) $s = 3t^2$

$V = 6t$

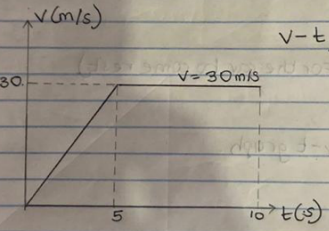
At $t = 5$.

$V = 6 \times 5$.

$V = 30 m/s$.

$s = 30t - 75$

$V = 30 m/s$.



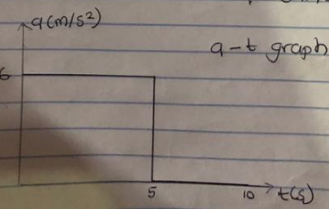
v-t graph

$V = (6t) m/s$.

$a = 6 m/s^2$

$V = 30 m/s$

$a = 0 m/s^2$.



a-t graph.

5.) $a = 20 m/s^2$ $a = -10 m/s^2$

$\int dv = \int a \cdot dt$

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

$v = 20t$

At $t = 5s$.

$v = 100 m/s$

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

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

$v - 100 = -10t + 50$

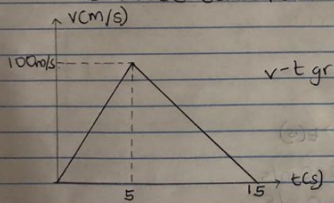
$v = (-10t + 150)\ m/s$.

At $v = 0$

$0 = -10t + 150$

$-150 = -10t$

$t = 15 sec$ (time for the car to come rest)



v-t graph.

6.) $v = 30t$

$\int ds = \int v\,dt$

$\int_0^s ds = \int_0^t (30t)\,dt$

$s = 15t^2$

At $t = 5s$.

$s = 15(5)^2$

$s = 375m$.