18/ENG02/022
COMPUTER ENGINEERING
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1 Fig - a

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

$S = 0.5t^3 m$

$\frac{ds}{dt} = V = 3(0.5)t^2$

$V = 1.5t^2$ m/c

at $t = 6$

$V = 1.5(6)^2$

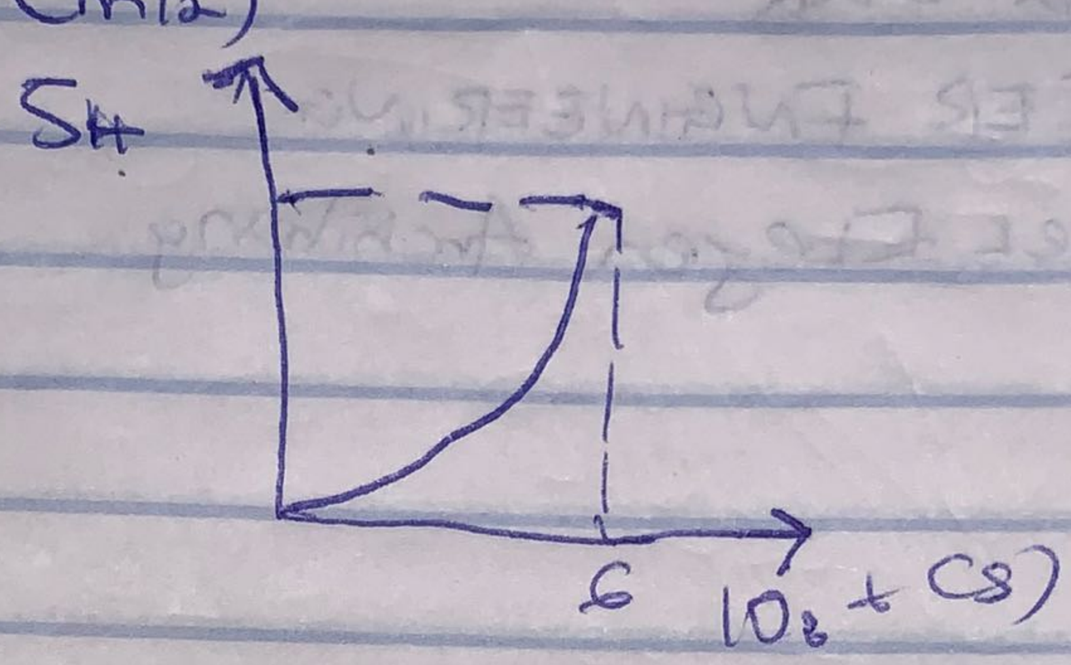
$V = 36 \times 1.5 = 54$ m/s

at $s = 108$m

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

$\therefore$ after 4t, $V = 0$ m/s

V-t graph for Fig-9



2) F12-10

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

$S = \int V dt = \frac{-4t^2}{2} + 80t$

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

$dv/dt = a$, $V = (-4t + 80)$ ft/s

$a = \frac{dv}{dt} = -4$ ft/s^2

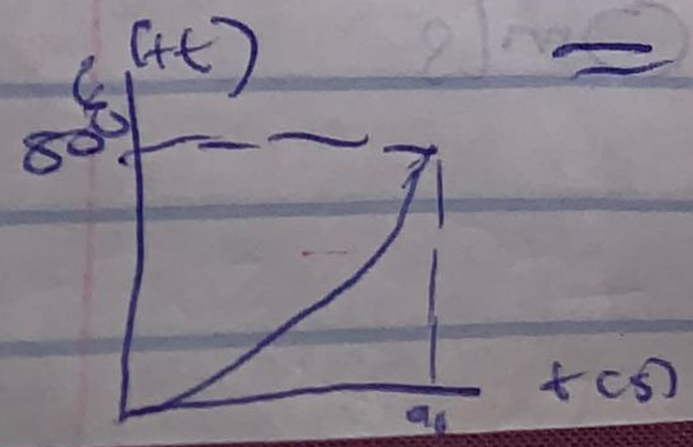
$S = -2t^2 + 80t$

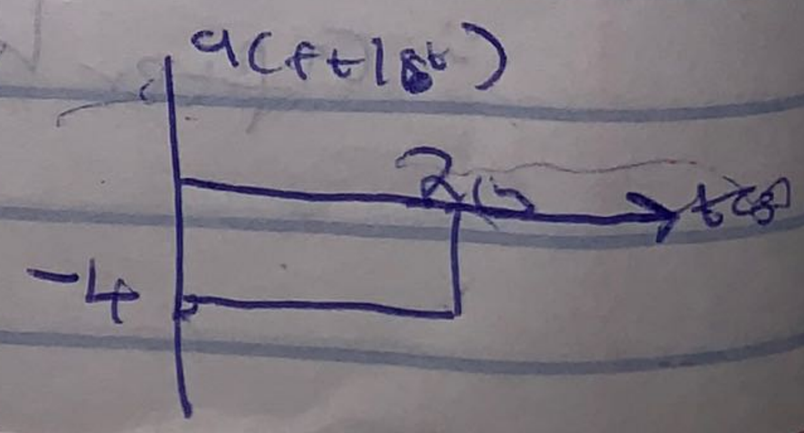
at $t = 20$

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

$= -800 + 1600$

$= 800$ ft





3. F12 -11

$a\,ds = v\,dv$

$a = v\frac{dv}{ds}$

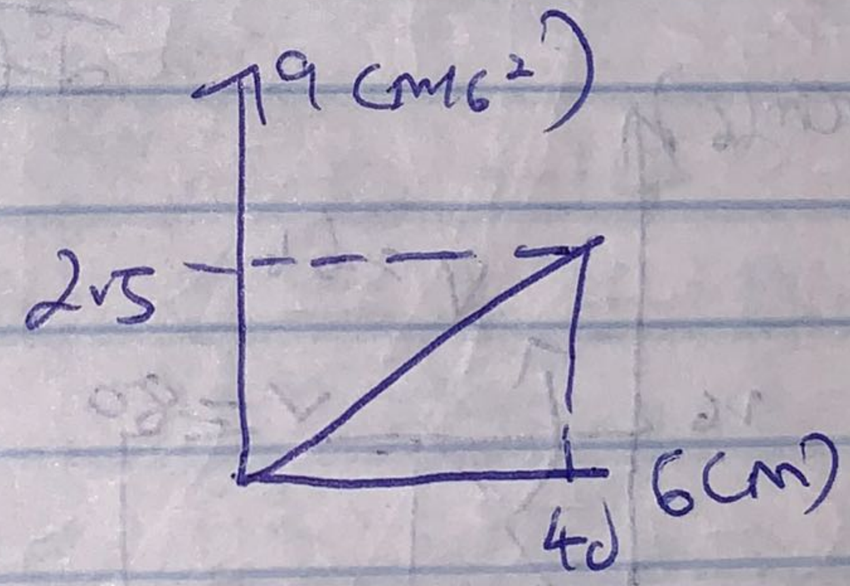
$a = (0.25s)\left[\frac{d}{dv}(0.25s)\right]$

$a = 0.25s \times 0.25$

$a = 0.0625s$

a at $s = 40 = 0.0625(40)$

$a = 2.5 m/s^2$



4. F12-12

For $0 \le t \le 5s$

$s = 3t^2$

$ds/dt = v = 6t\ m/s$

at $t = 5s$

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

For $5s < t \le 10s$

$$v = \frac{\Delta s}{\Delta t} = \frac{225m - 75m}{10s - 5s} = 30m/s$$

for a – t graph

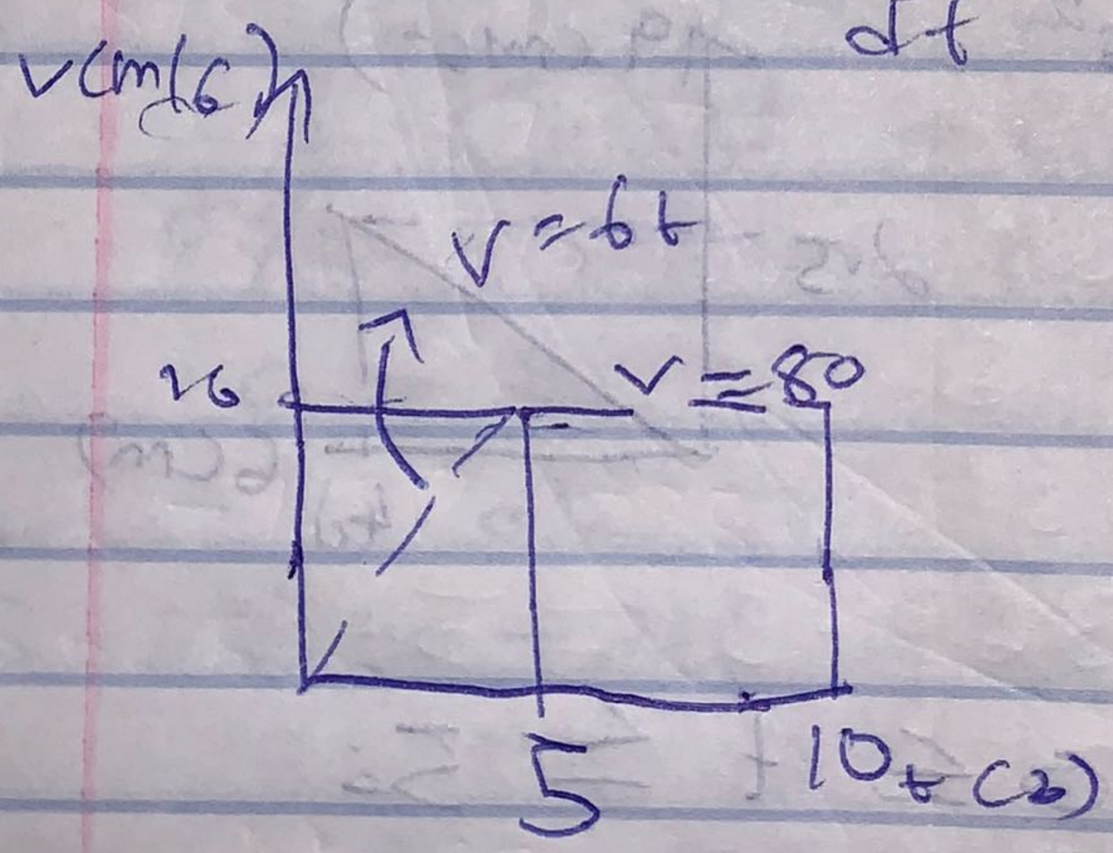
$0 \le t < 5s \quad v = 6t\ m/s$

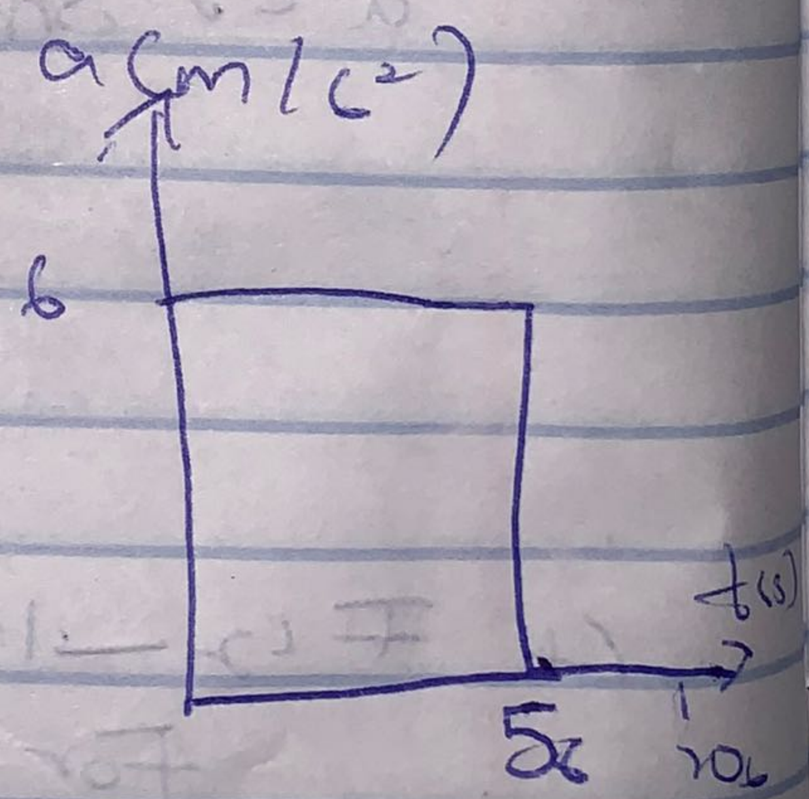
$a = \frac{dv}{dt} = 6m/s^2$

$5 < t \le 10s$

$v = 30m/s$

$a = \frac{dv}{dt} = 0m/s^2$





5) F12-13

$20 m/s^2$ for 5s and ~~the~~ decelerates at 10m/s

$dv = a\,dt$

at $v=0$ and $t=0$

$0 \le t < 5s$,

$a = 20 m/s^2$

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

$\therefore v = 20t$

when $t = 5s$,

$v = 20(5) = 100 m/s$

$\Rightarrow 5s < t \le t'$

$\int_{100 m/s}^{v} dv = \int_{5s}^{t} (-10)\,dt$

$v = (-10t + 50) + 100 m/s$

$v = -10t + 150 m/s$

$0 = A_1 + A_2 = A_v$

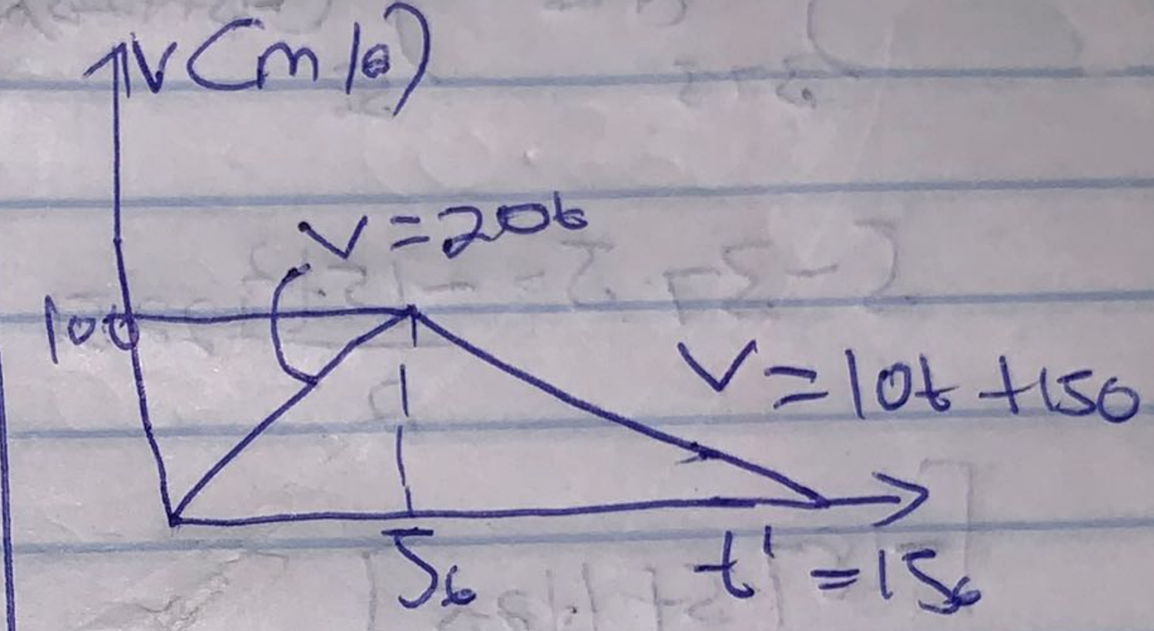
$0 = (20 m/s^2)(5)$

$+ (-10)(t' - 5s)$

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

$t' = -150$

$\overline{-10}$ $t' = 15s$



6) F12-14

$0 \le t \le 15s$

$v = 30t\ m/s$

$\int_0^s ds = \int_0^t 30t$,

$s = 15t^2\ m$

When $t = 5s$, $s = 15(5)^2$

$= 375 m$