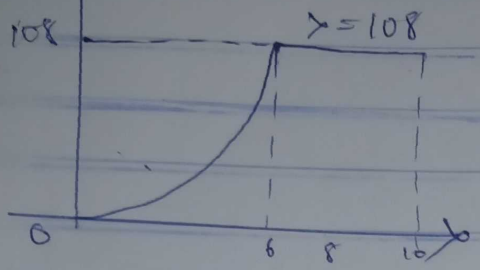
IGE MALOWA
CIVIL ENGINEERING
18/ENG03/030.

1) s(m)



$V = ds/dt$

$V = 1.5t^2$

when $t = 6$

$V = 1.5 \times 6^2$

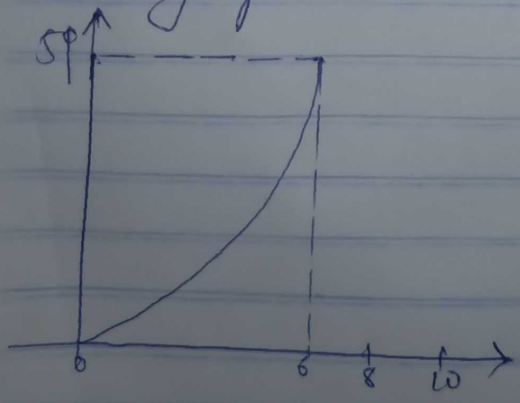
$= 1.5 \times 36$

$V = 54 m/s$

$t = 6s - 10s$,

8s $\therefore V = 0$

V-t graph



$S = \int v\,dt$

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

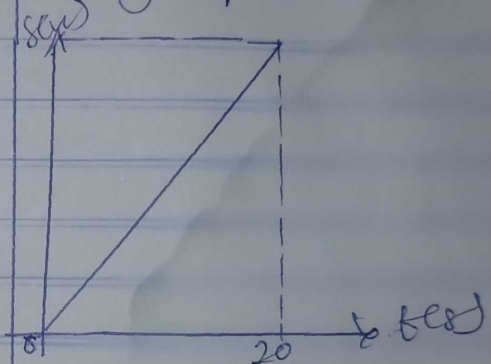
$S = -2t^2 + 80t$

at $t = 20s$

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

$S = 800m$

S-t graph.



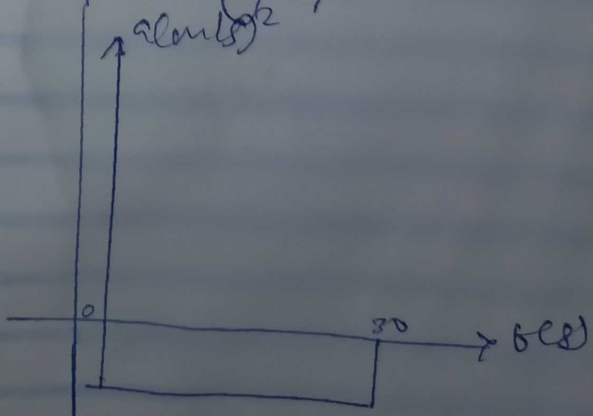
acceleration

$a = dv/dt$

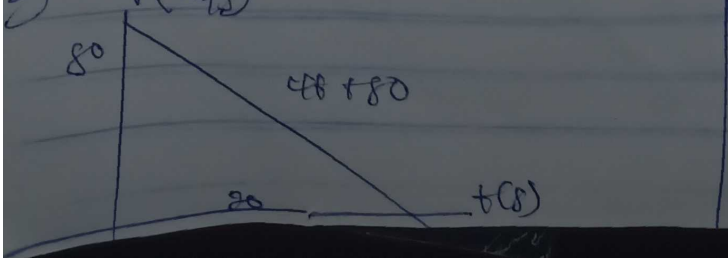
$a = \frac{800}{20}$, $a = 4$

at $t = 20$, $a = -4 m/s$

a-t graph.



2) V(m/s)



V(m/s)

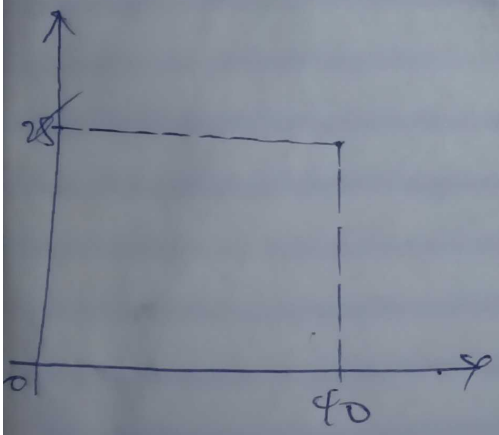
$a = (dV/ds)V$

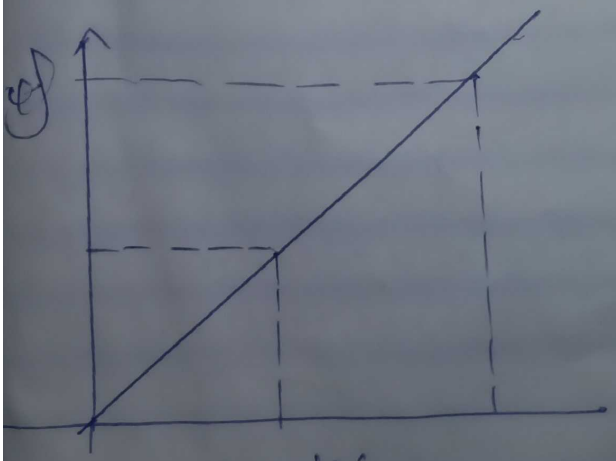
$V = 0.25S$

$a = 10 \times d(0.25)/ds$

$a = 10 \times 0.25$

a-S graph





$V = ds/dt$

When $t = 5$

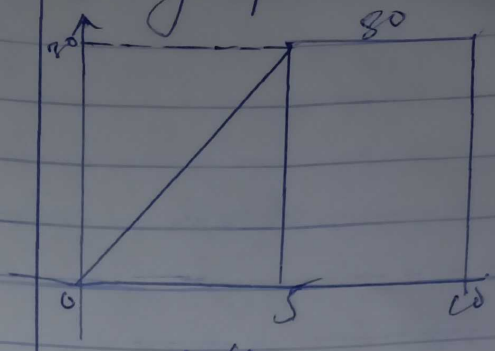
$V = 6t = 6 \times 5$

$= 30 m/s$

at $t = 10$,

$V = 30 m/s$.

V-t graph



$a = dV/dt$

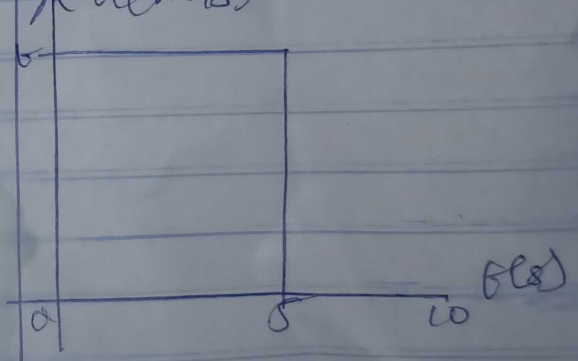
When $t = 5$

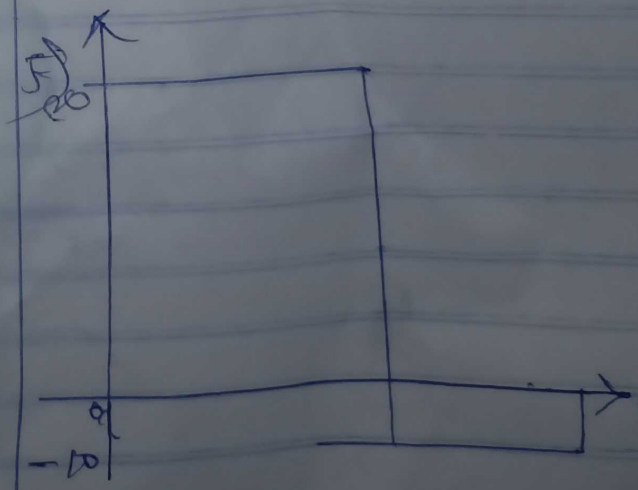
$a = 6$

When $t = 10$

$a = 0$

a-t graph





$V = \int a\,dt$

$V = \int 20t$

$V = 20$

when $t = 5$

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

$5 < t < t'$

$\int 100\,dv = \int 5^{t'} - 10t\,dt$

$V - 100 = -10t^2 + 10(5)$

$V - 100 = -10t + 50$

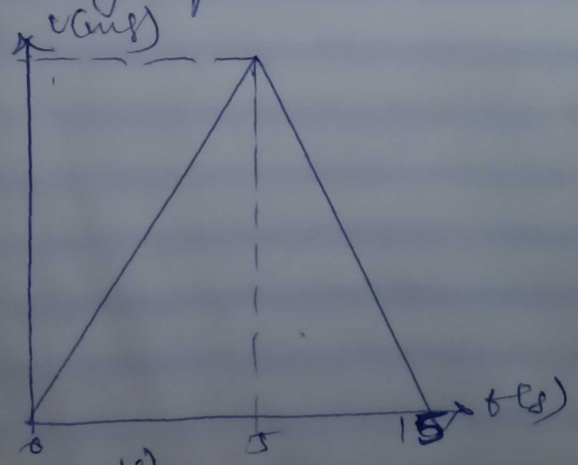
at t', $V = 0$

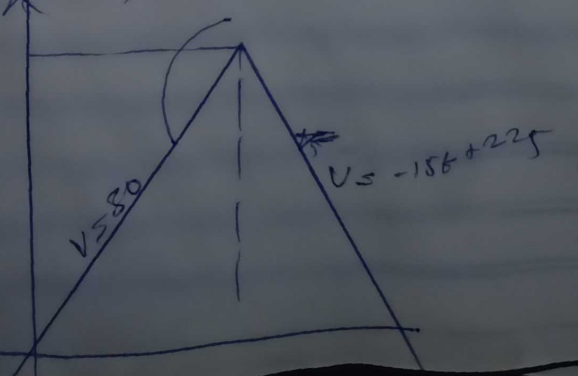
$0 - 100 = -10t + 50$

$10t' = 150$

$t' = 15s$

V-t graph





$0 \leq t \leq 5$

$V = 30t$

$\int_0^s ds = \int_0^5 30t$

$\int_0^5 = 15t^2$

$\int = 15(5)^2 - 15(0)^2$

$\int = 15t + 225$

$\int_{378}^{s} ds = \int_2^{13} (-15t + 225)\,dt$

$\int -875 = -\frac{15t^2}{2} + 225t \Big|_5^{15}$

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

$\int -375 = (-1687.5 + 3375) - (-187.5 + 1125)$

$\int -375 = 1687.5 - 937.5$

$\int -375 = 750$

$s = 750 + 375$

$s = 1125 m.$