F12-9 and F12-10 Solution

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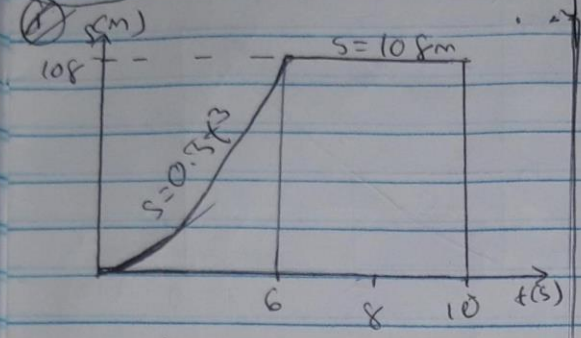
ENG 234 Assignment

(F12-9)



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

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

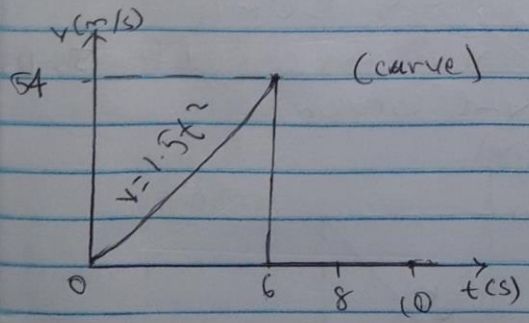
at $t = 6s$,

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

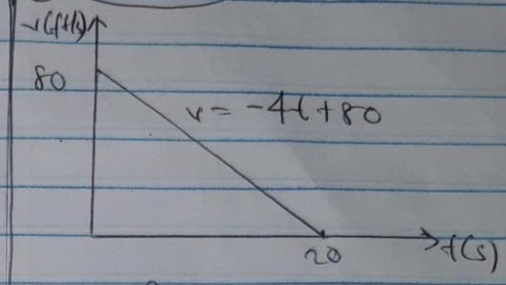
at time interval 6s - 10s, displacement remains constant (108m)

$\therefore v = 0$

v - t Graph



(F12-10)



$s = \int v\,dt$

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

$s = \frac{-4t^2}{2} + 80t$

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

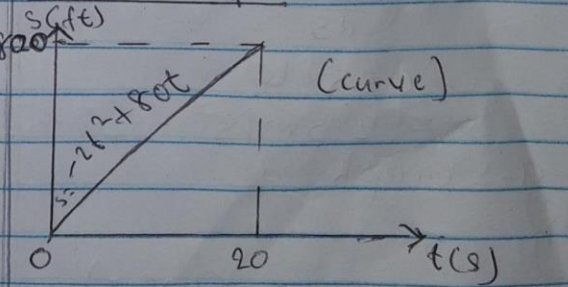
at $t = 20s$

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

$= 1600 - 800$

$= 800 ft$

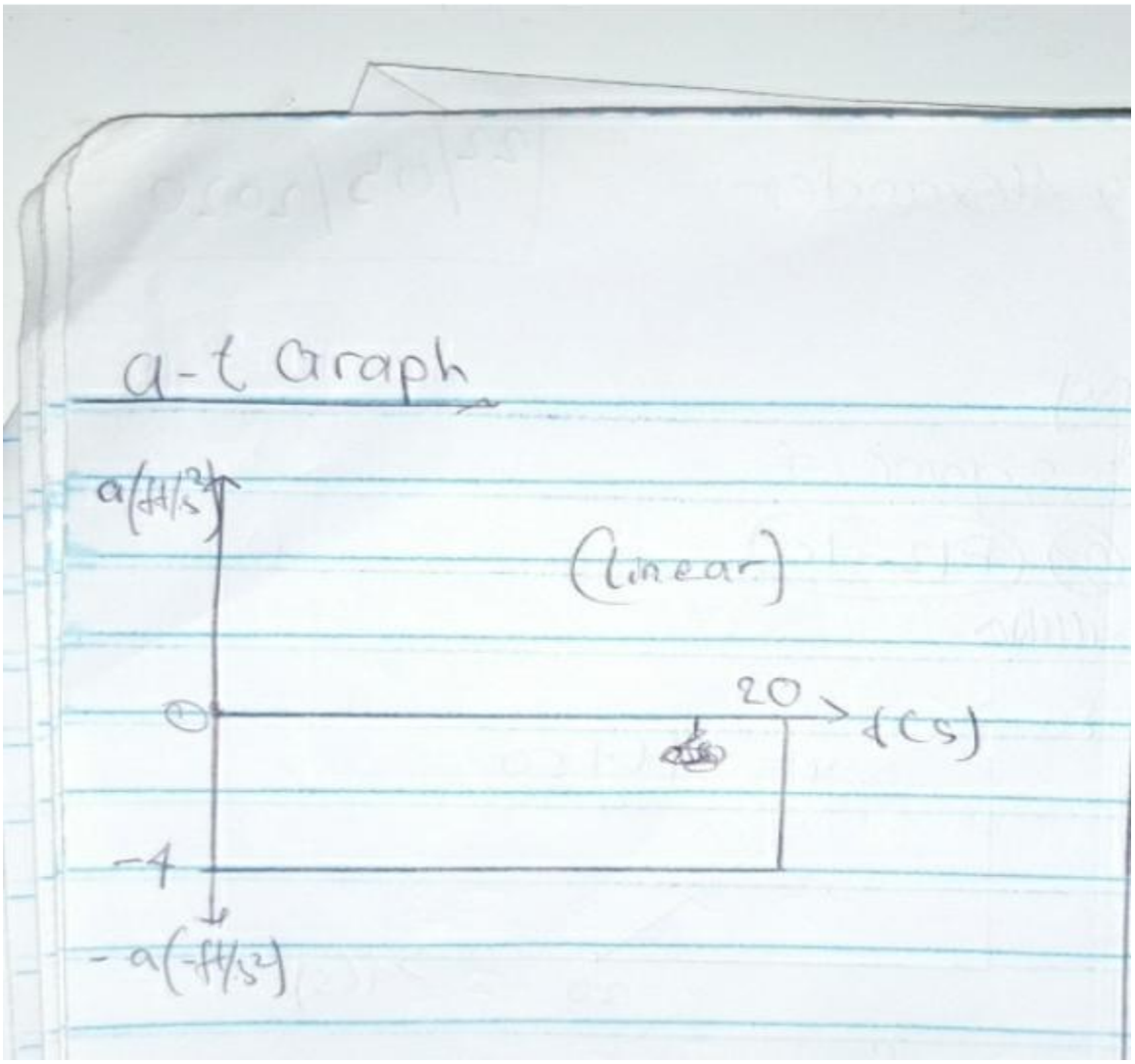
(i) s - t Graph



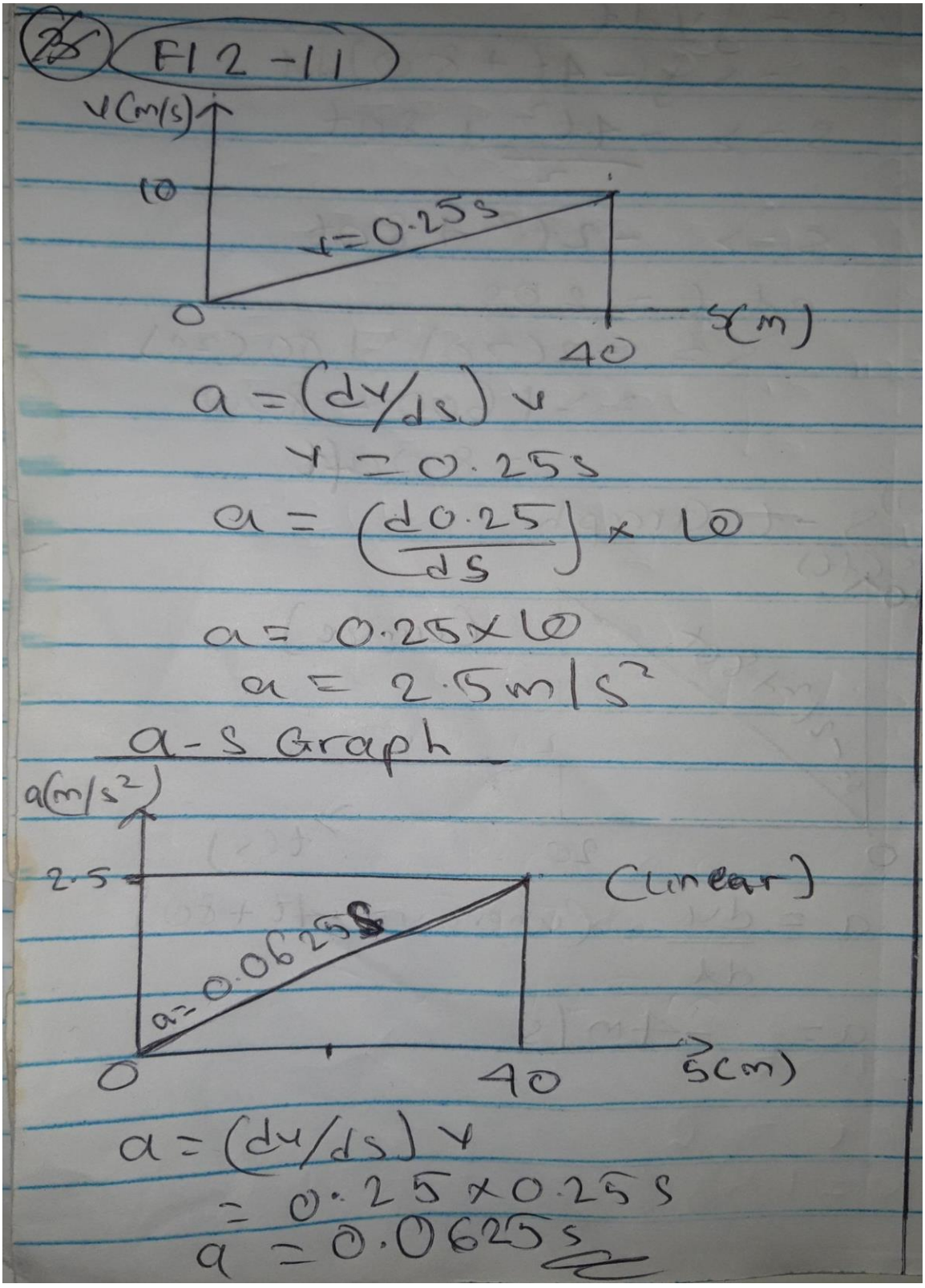
$a = \frac{dv}{dt}$ (where $v = -4t + 80$)

$a = -4 m/s$

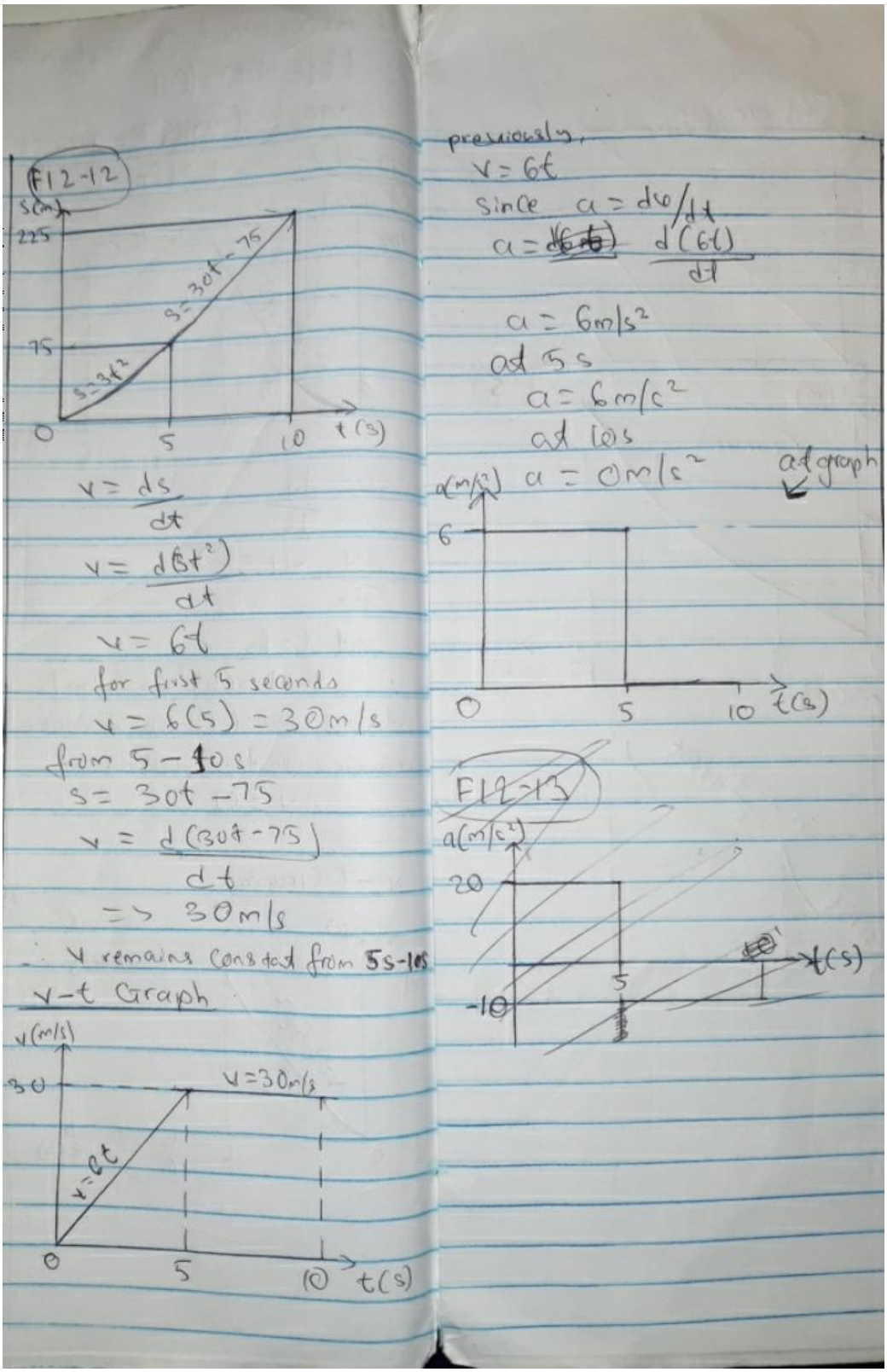
a-t Graph For F12-10



F12-11 Solution

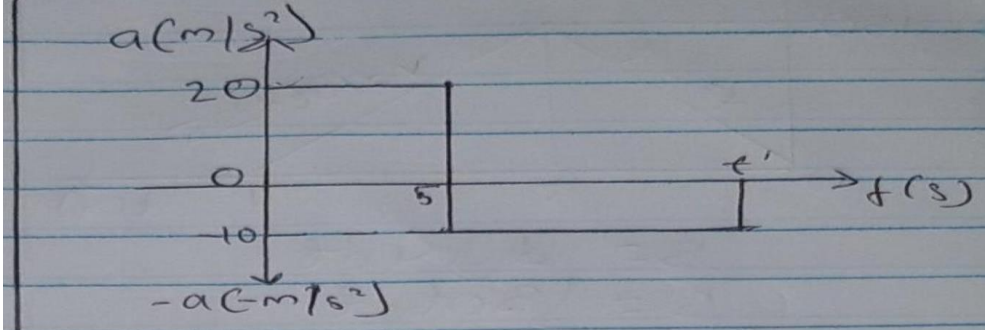


F12-12 Solution



F12-13 Solution

F12-13



$v = \int a\,dt$

$a = 20\ m/s^2$

$v = \int 20\,dt \Rightarrow 20t$

for $t = 5$ seconds

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

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

$v - 100 = -10t \Big|_{5}^{t'}$

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

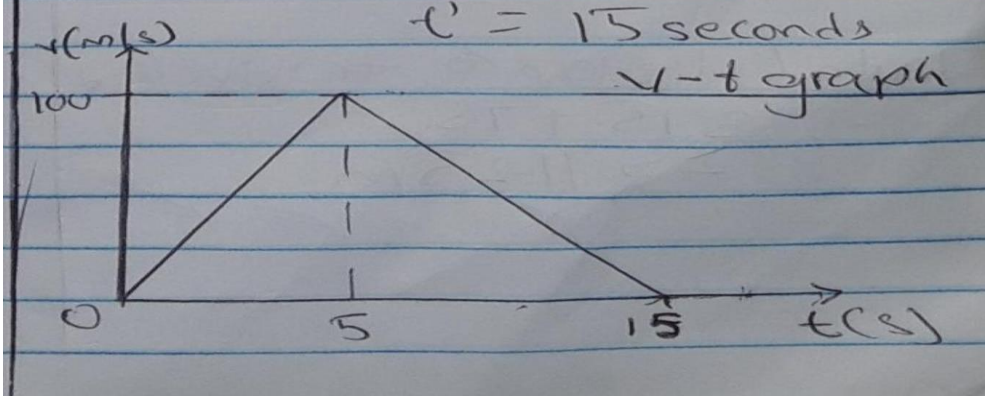
but $v = 0$ at rest

$\therefore -100 = -10t' + 150$

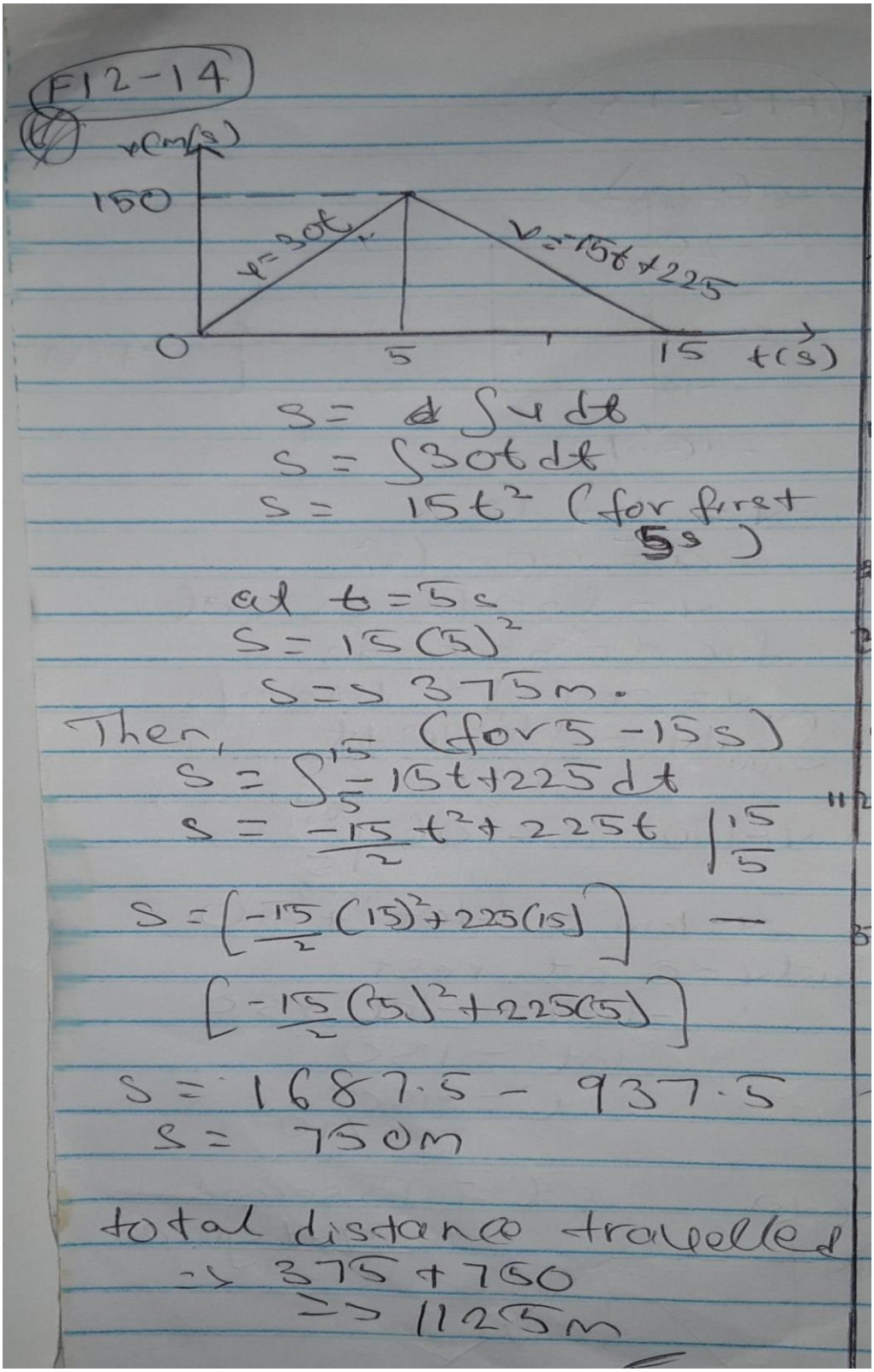
$10t' = 150$

$t' = 150/10$

$t' = 15$ seconds



F12-14 Solution



$s = \int v\,dt$

$s = \int 30t\,dt$

$s = 15t^2$ (for first 5s)

at $t = 5$ s

$s = 15(5)^2$

$s = 375$ m.

Then, (for 5 - 15 s)

$s = \int_5^{15} -15t + 225\,dt$

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

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

$s = 1687.5 - 937.5$

$s = 750$ m

total distance travelled

$= 375 + 750$

$= 1125$ m

F12-14 S-t Graph