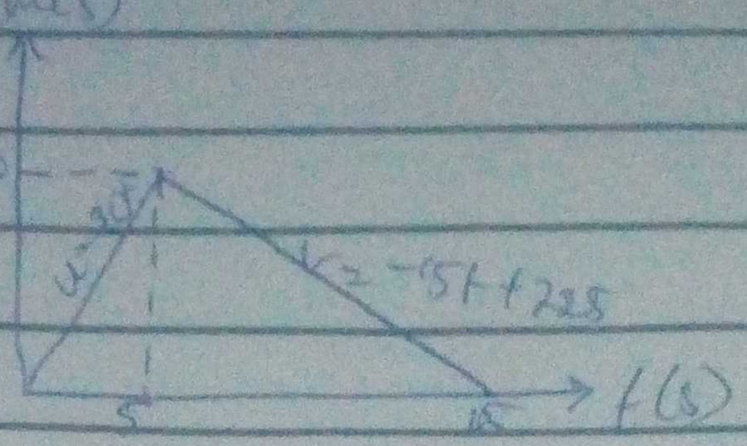
6



$0 \leq t \leq 5_s$

$v = 30t$

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

$s = 15t^2 \Big|_0^5$

$s = 15(5)^2 - 15(0)^2$

$s = 15 \times 25$

$s = 375_m$

$5_s \leq t \leq 15_s$

$v = -15t + 225$

$\int_{375}^{s} ds = \int_5^{15} (-15t + 225)\,dt$

$s - 375 = \frac{-15t^2}{2} + 225t \Big|_5^{15}$

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

$s - 375 = \left[\frac{-15 \times 225}{2} + 3375\right] - \left[\frac{-15 \times 25}{2} + 1125\right]$

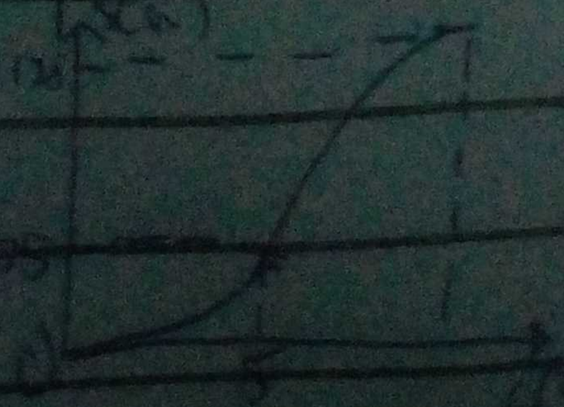
$s - 375 = (-1687.5 + 3375) - (-187.5 + 1125)$

$s - 375 = +1687.5 - 937.5$

$s - 375 = 750$

$s = 1125_m$

s-t graph



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

at $t = 5s$

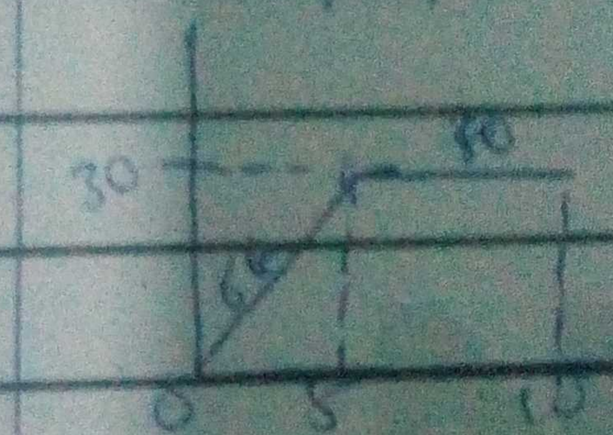
$v = (t = 6)5$

$= 30 m/s$

at $t = 10$

$v = 30 m/s$

v-t graph



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

at $t = 5s$

$a = 6 m/s^2$

at $t = 10s$

$a = 0 m/s^2$

a-t graph

iii) $v = \int a\,dt$

$v = \int 20\,dt$

at $t = 5s$

$v = 20 \times 5 = 100 m/s$

$5s < t \leq t'$

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

$v - 100 = -10t \Big|_5^{t'}$

$v - 100 = -10t' + 10(5)$

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

at t', $v = 0$

$0 - 100 = -10t + 50$

$10t' = 150$

$t = 15s$

v-t graph

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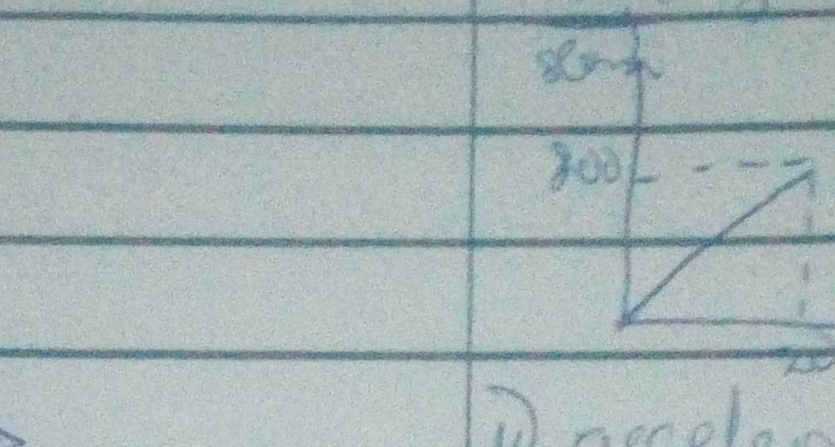
1 S-t graph



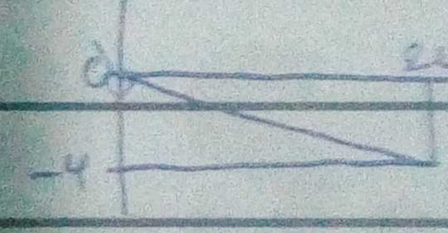
ii) acceleration

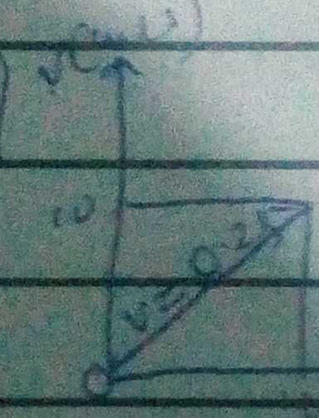
$a = \frac{dv}{dt}$

$\therefore a = -4 m/s$

at $t = 20s$, $a = -4 m/s^2$

a-t graph



iii) 

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

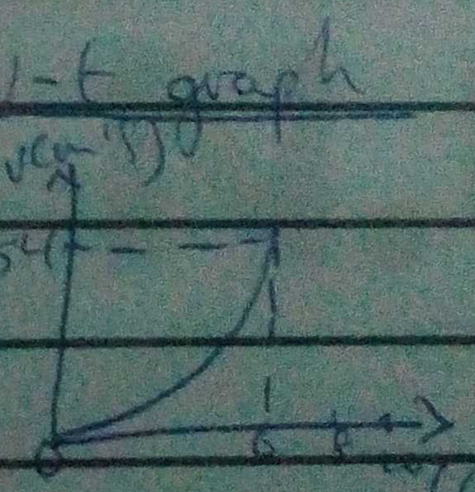
$v = 0.25s$

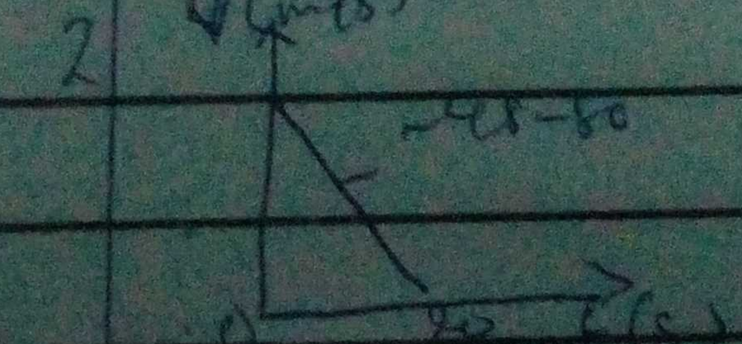
$a = (0.25s)\frac{d}{ds}(0.25s)$

$a = (0.25s) \times 0.25$

$a = 2.5 m/s$

v-t graph



2 

i) $S = \int v dt$

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

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

at $t = 20s$

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

$S = 1600 - 800 = 800m$