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1 $S = 0.5t^3$

at $0 < t < 6s$

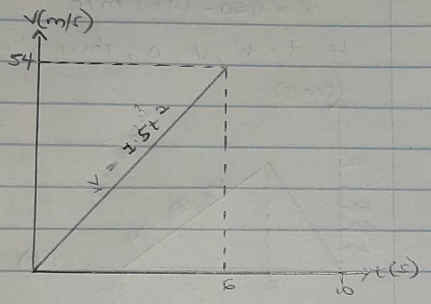
$V = \frac{ds}{dt} = 1.5t^2 m/s$

$V = 1.5(6)^2 = 54 ms^{-1}$

$6 < t < 10 secs$

$S = 108$

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



2 $V = -4t + 80$

$\int_0^S ds = \int_0^t dt$

$S = \int_0^{20} (-4t + 80)$

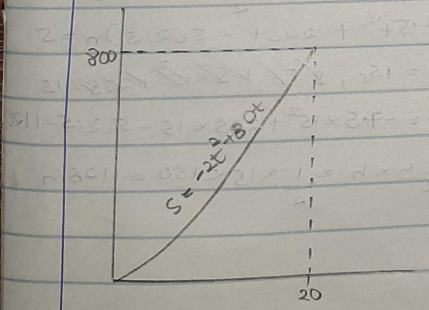
$S = [-2t^2 + 80t]_0^{20}$

$0 < t < 20 secs$

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

$S = -800 + 1600$

$S = 800 ft$



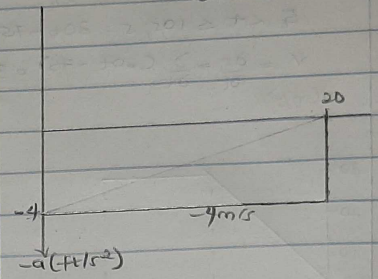
S-t graph

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

$0 < t < 20s$

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

A-t graph



3) Co get A-S graph

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

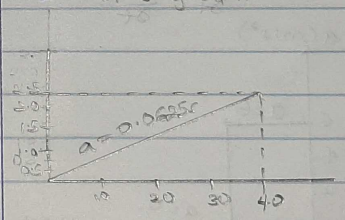
but $v = 0.25s$

$a = 0.25s \frac{d}{ds}(0.25s) = 0.0625s$

$0 \leq s < 40m$

$a/s = 40m = 0.0625 \times 40 = 2.5 m/s^2$

A-S graph



④

To get v-t graph

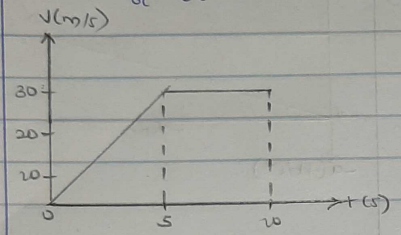
$0 \le t < 5s \quad s = 3t^2$

$v = \frac{\partial s}{\partial t} = \frac{\partial}{\partial t}(3t^2) = 6t \text{ m/s}$

at $t = 5s$, $(v|t=5s)$, $v = 6 \times 5 = 30 \text{m/s}$

$5s < t \le 10s, \quad s = 30t - 75$

$v = \frac{\partial s}{\partial t} = \frac{\partial}{\partial t}(30t - 75) = 30 \text{m/s}$



v-t graph

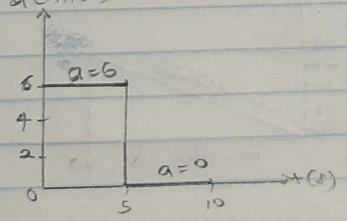
for a-t graph

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

$a = \frac{\partial v}{\partial t} = \frac{\partial}{\partial t}(6t) = 6 \text{m/s}^2$

$5s < t \le 10s, \quad v = 30$

$a = \frac{\partial v}{\partial t} = \frac{\partial}{\partial t}(30) = 0$



a-t graph

⑤

to get the v-t graph

$0 \le t < 5s, \quad \delta v = a\delta t$

$\int_0^v \delta v = \int_0^t 20t, \quad v = 20t \text{ m/s}$

at $t = 5s, \quad v = 20 \times 5 = 100 \text{m/s}$

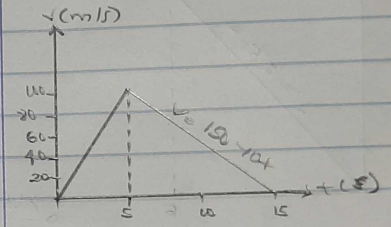
$5s < t \le t \quad \delta v = a\delta t$

$\int_{100}^v \delta v = \int_5^t -20t$

$v - 100 = -20t + 50$

$v = (150 - 20t) \text{ m/s}$

At $t = t', v = 0$, thus $t' = 15s$



⑥ To get s-t graph

$0 \le t < 5s, \quad \delta s = v\delta t$

$\int_0^s \delta s = \int_0^t 20t\,\delta t$

$s = \frac{20}{2}t^2 = 15t^2$

at $t = 5, \quad s = 15 \times 5^2 = 375 \text{m}$

$5s < t \le 15s, \quad v = -15t + 225$

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

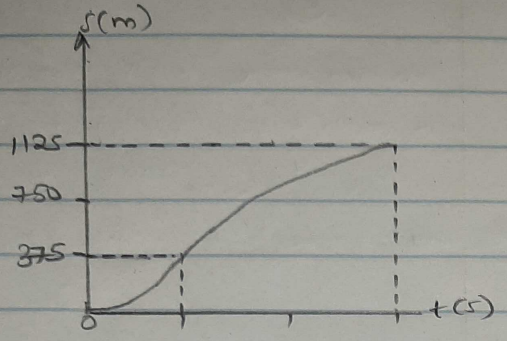
$s - 375 = -7.5t^2 + 225t \Big|_5^t$

$s - 375 = -7.5t^2 + 225t - (-\frac{375}{2} + 1125)$

$(-7.5t^2 + 225t - 562.5)\text{m} = s$

At $t = 15s, \quad s = -7.5 \times 15^2 + 225 \times 15 - 562.5 = 1125 \text{m}$

$s = \frac{1}{2} b \times h = \frac{1}{2} \times 15 \times 150 = 1125 \text{m}$



s-t graph