

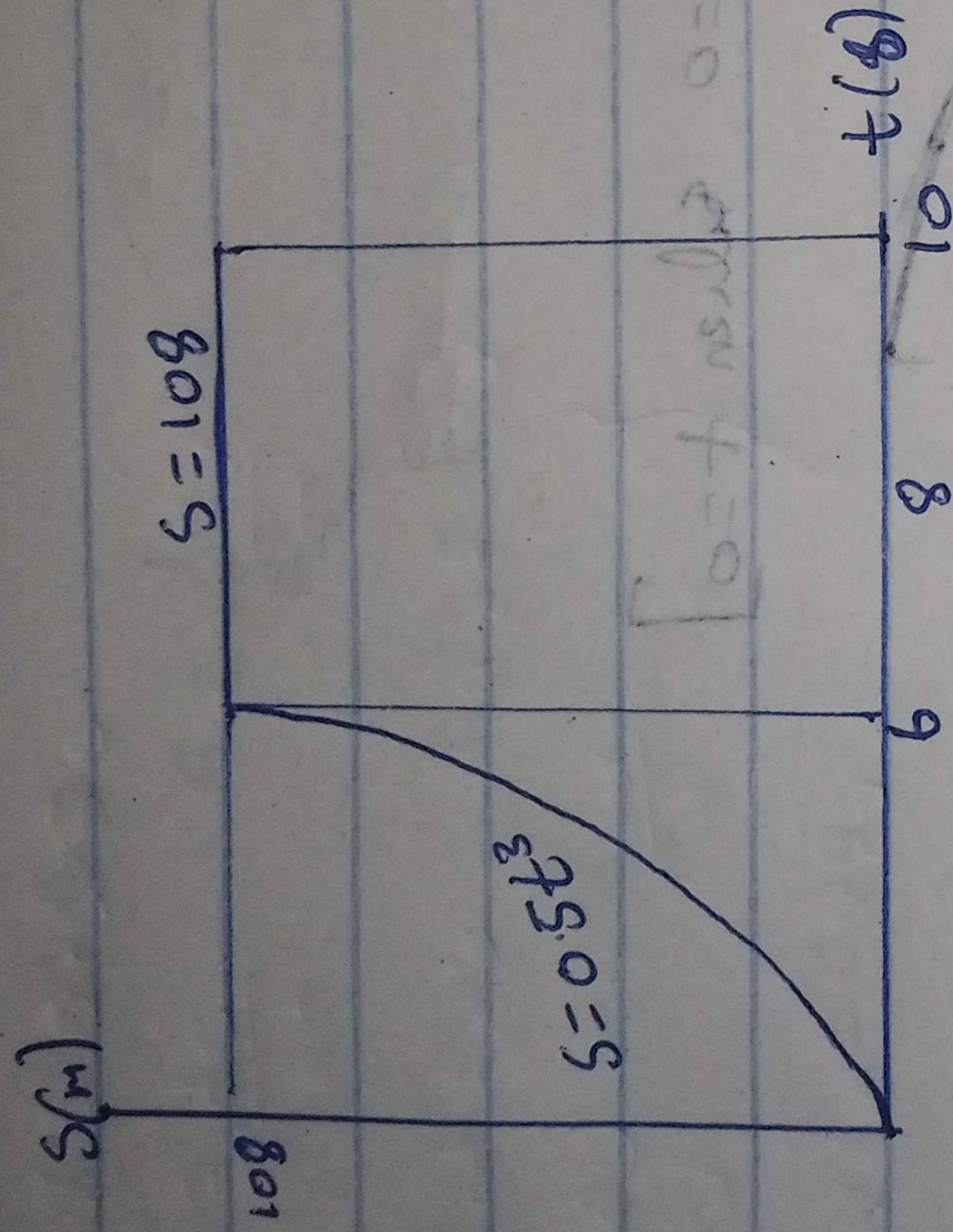
CHINA WISDOM ENVICTIONS

18/ENG041025

Elect/Elect

ENG 234 ENGINEERING MECHANICS

①



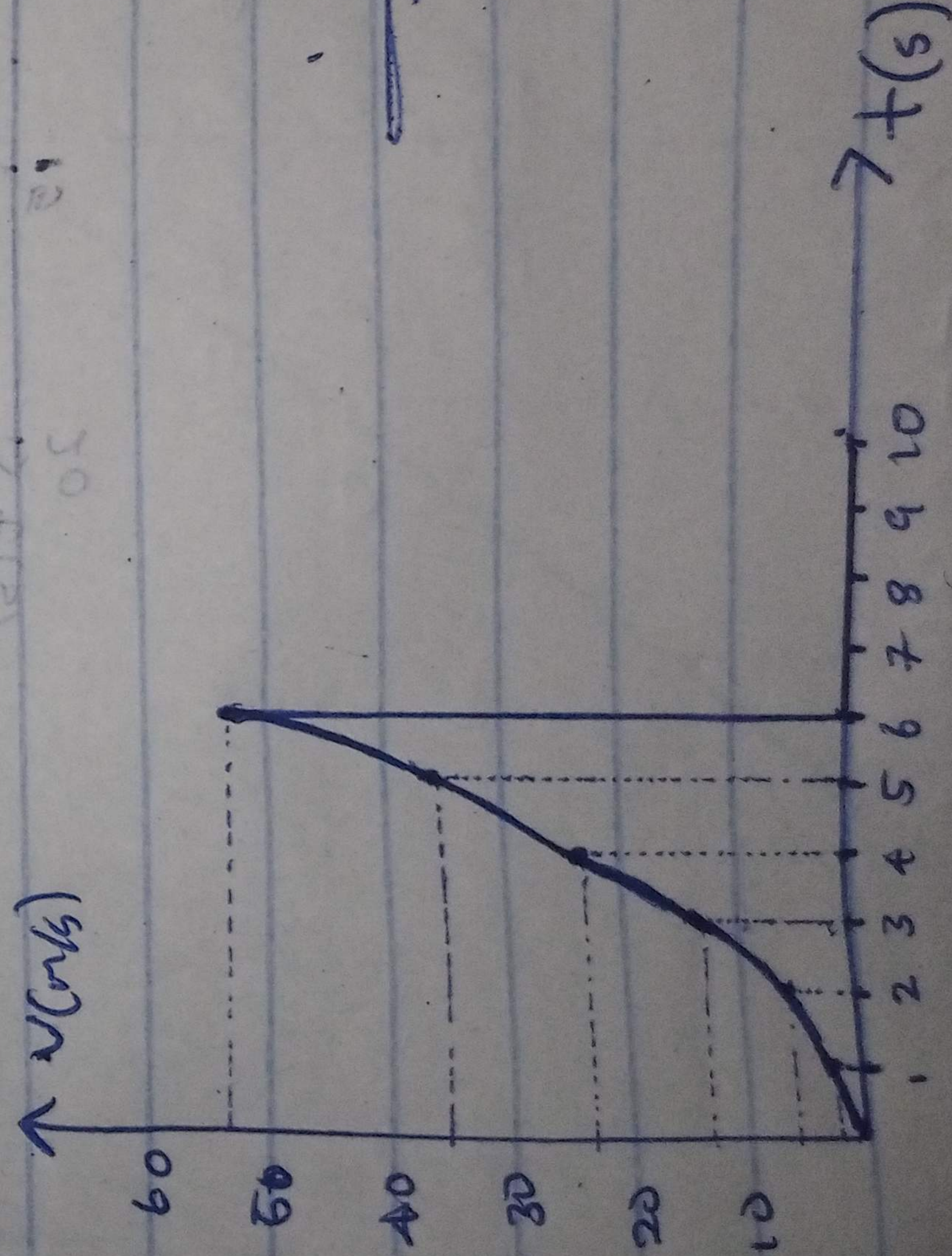
$0.8 + 1.4 - 1.1$
 $1.6 \times 0.8 = 1.28$
 $3-t$ graph
 $1.08 + 8.01 = 9.09$
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for $t = 0(s) \rightarrow 6(s)$, $s = 0.5t^3$

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

for $t = 6(s) \rightarrow 10(s)$, $s = 108$

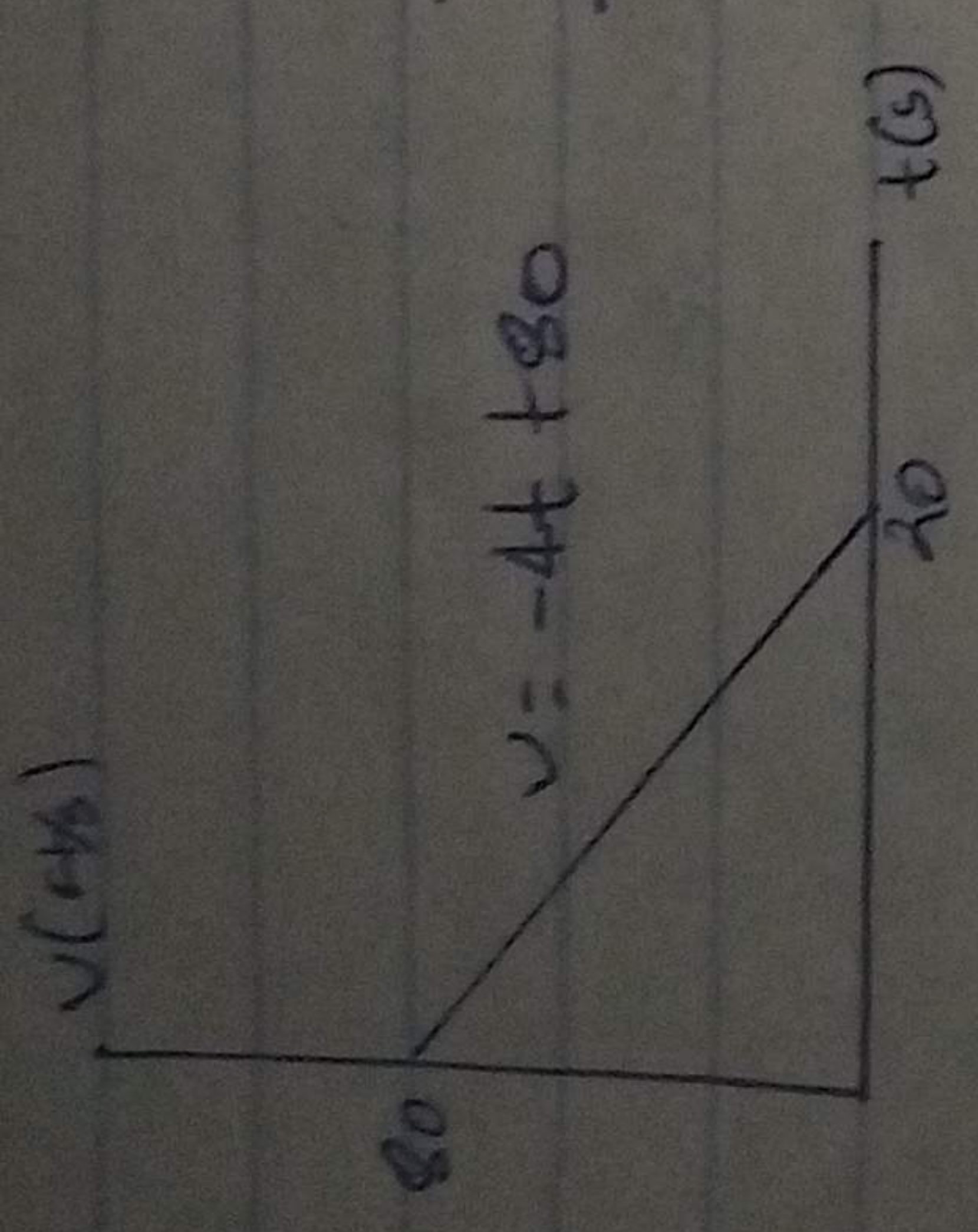
$v = \frac{ds}{dt}$ $v = 0$



v-t graph

$0.8 + 1.4 - 1.1$
 $1.6 \times 0.8 = 1.28$
 $1.08 + 8.01 = 9.09$

②



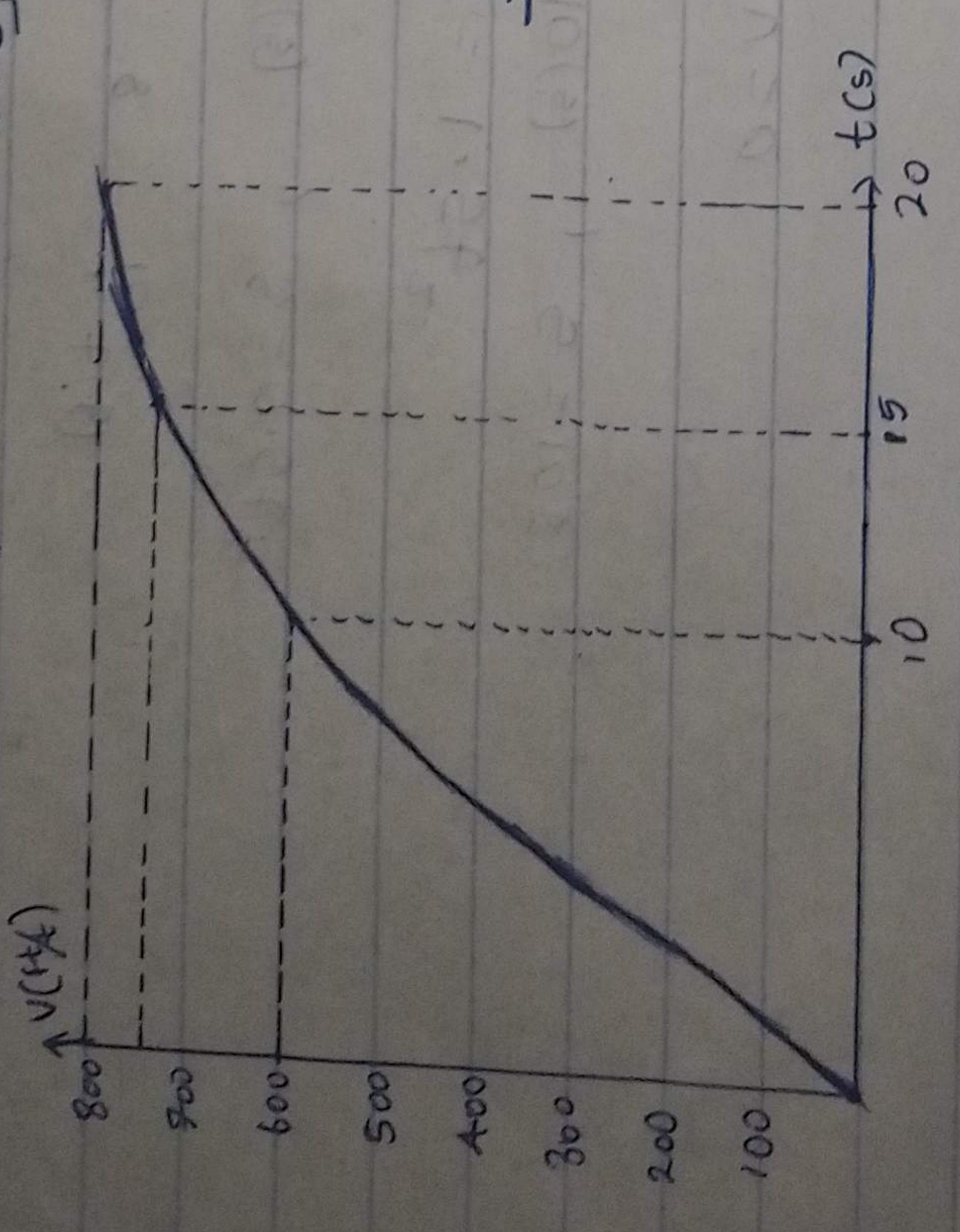
v-t graph

$$v = -4t + 80$$

$$s = \int v dt$$

$$s = -2t^2 + 80t + s_0$$

$$s = -2t^2 + 80t \quad [s_0 = 0 \text{ when } t = 0]$$



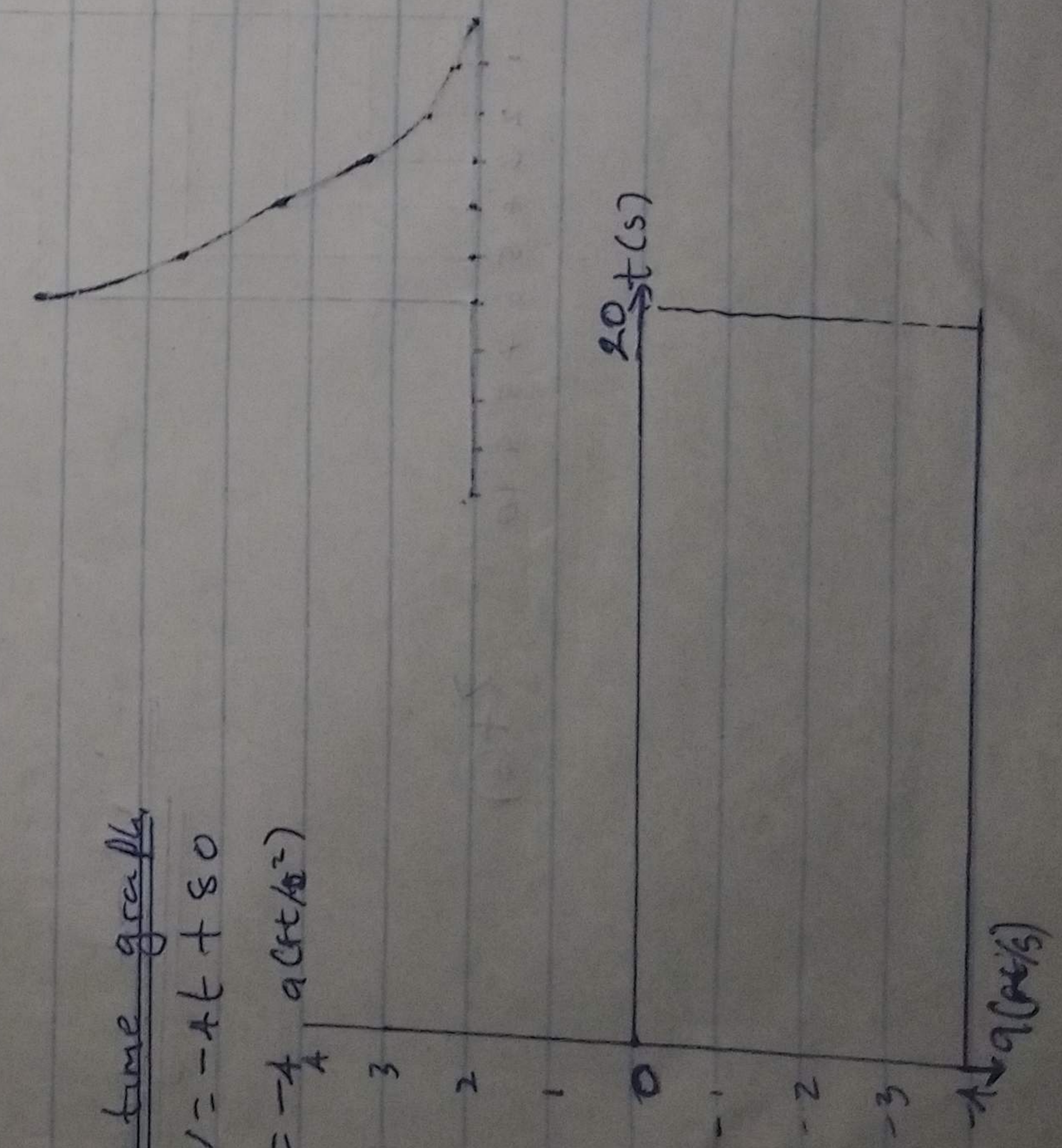
s-t graph

acceleration time graph

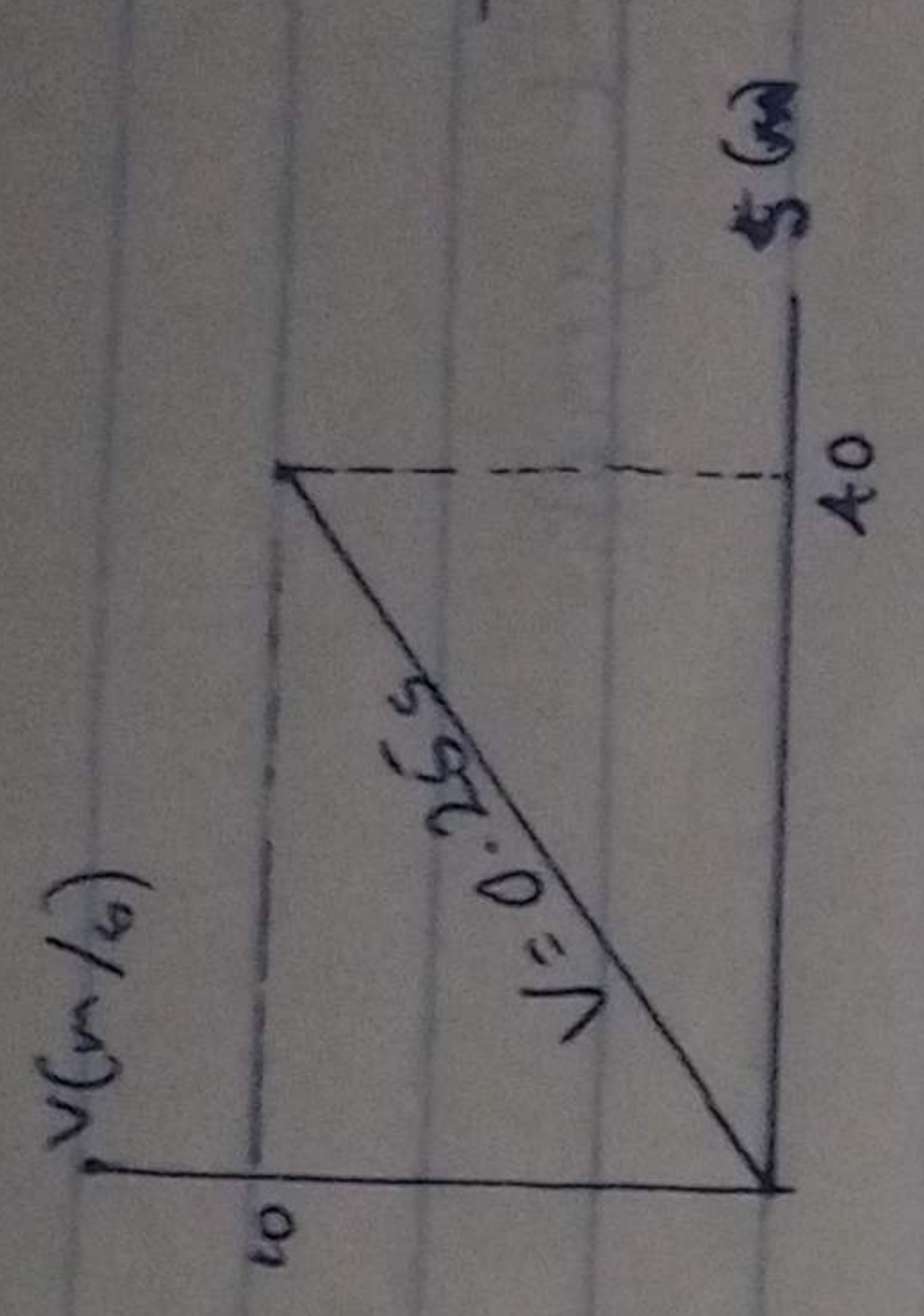
$$a = \frac{dv}{dt}$$

$$a = -4 \quad a \text{ (m/s}^2\text{)}$$

a-t graph



③



v-t graph

$$v = 0.25s$$

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

$$v dt = ds, \quad a dt = dv$$

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

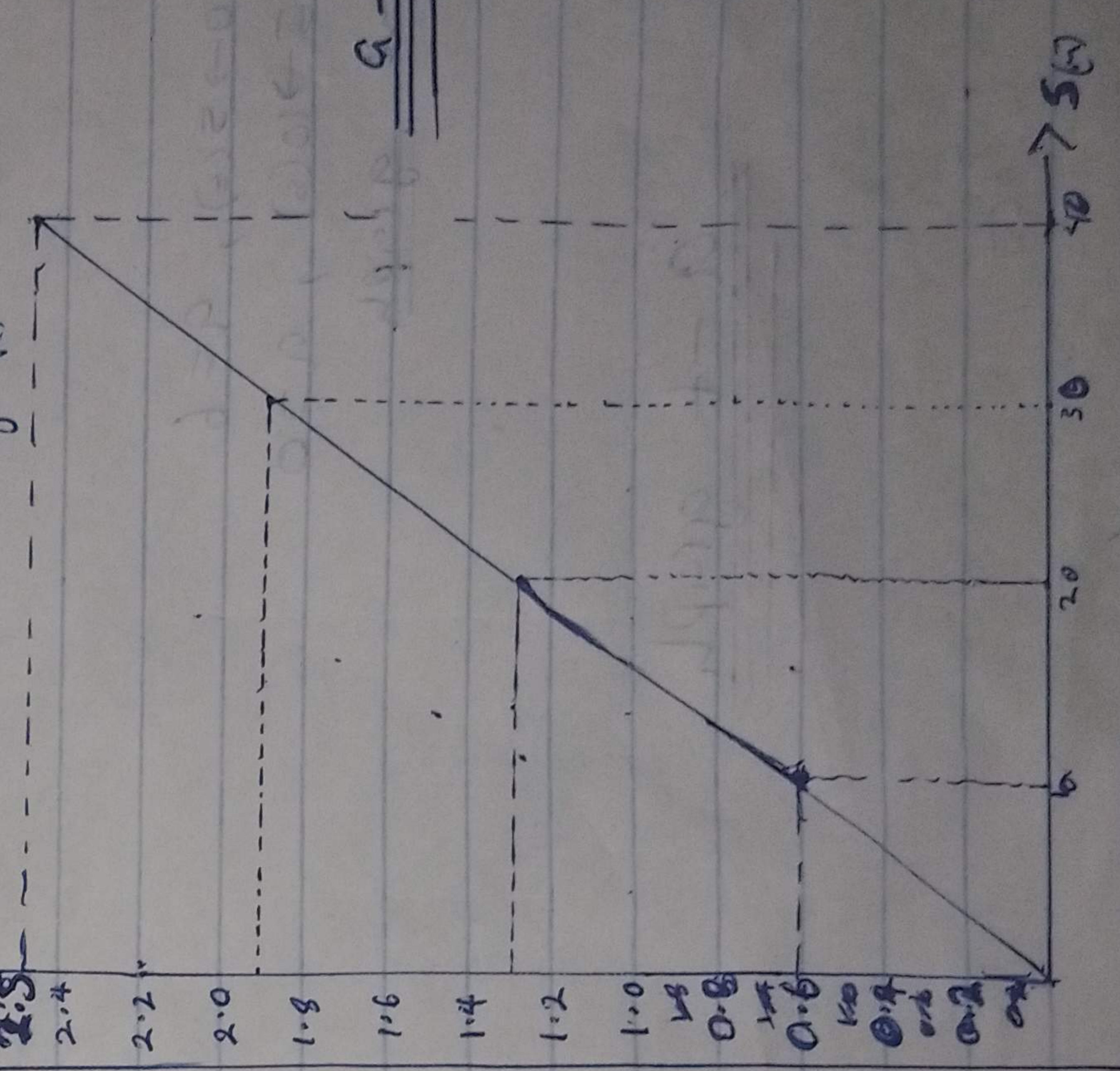
$$v dv = a ds$$

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

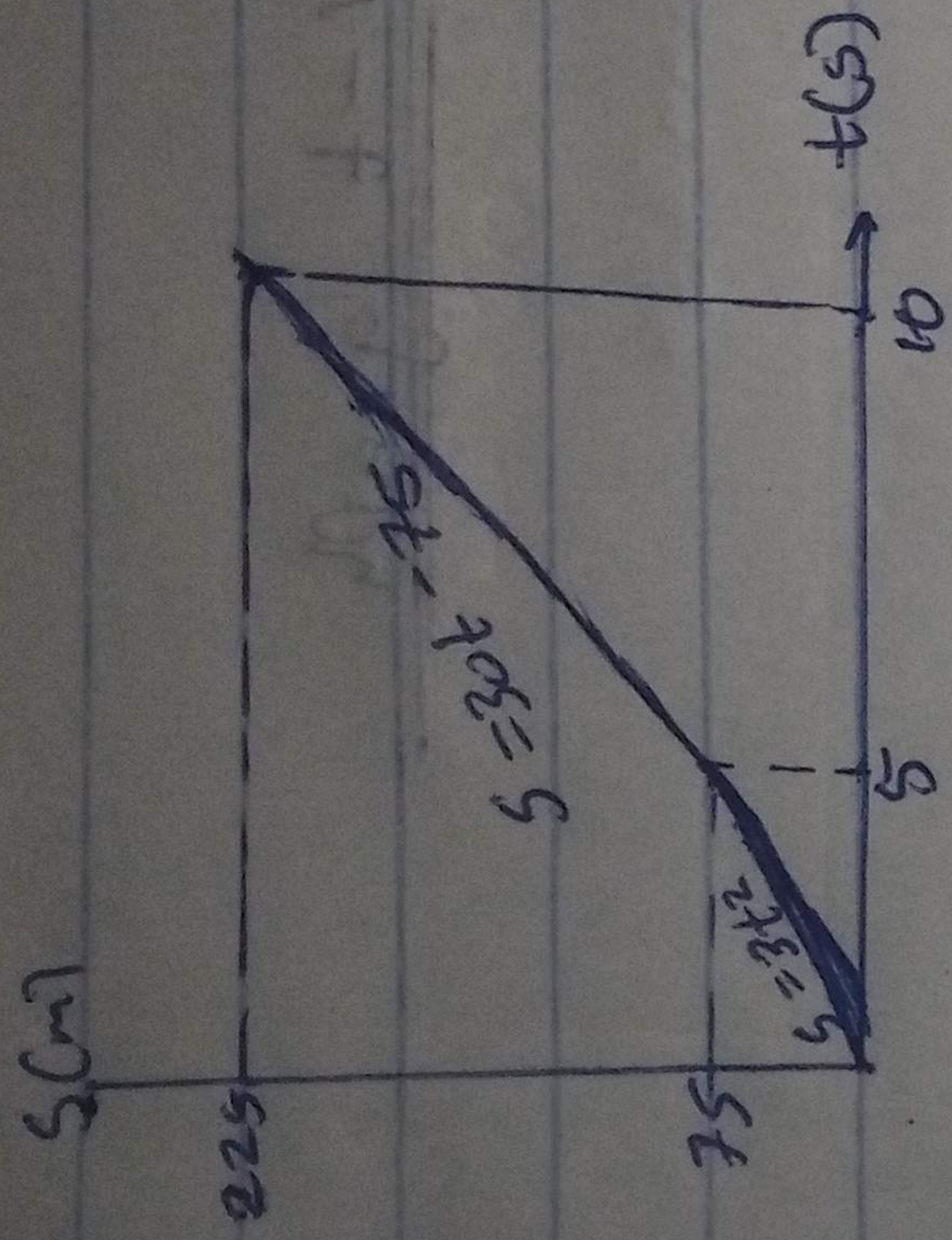
$$a = 0.25s (0.25)$$

$$a = 0.0625s$$

acceleration - position graph



a-s graph



S-t graph

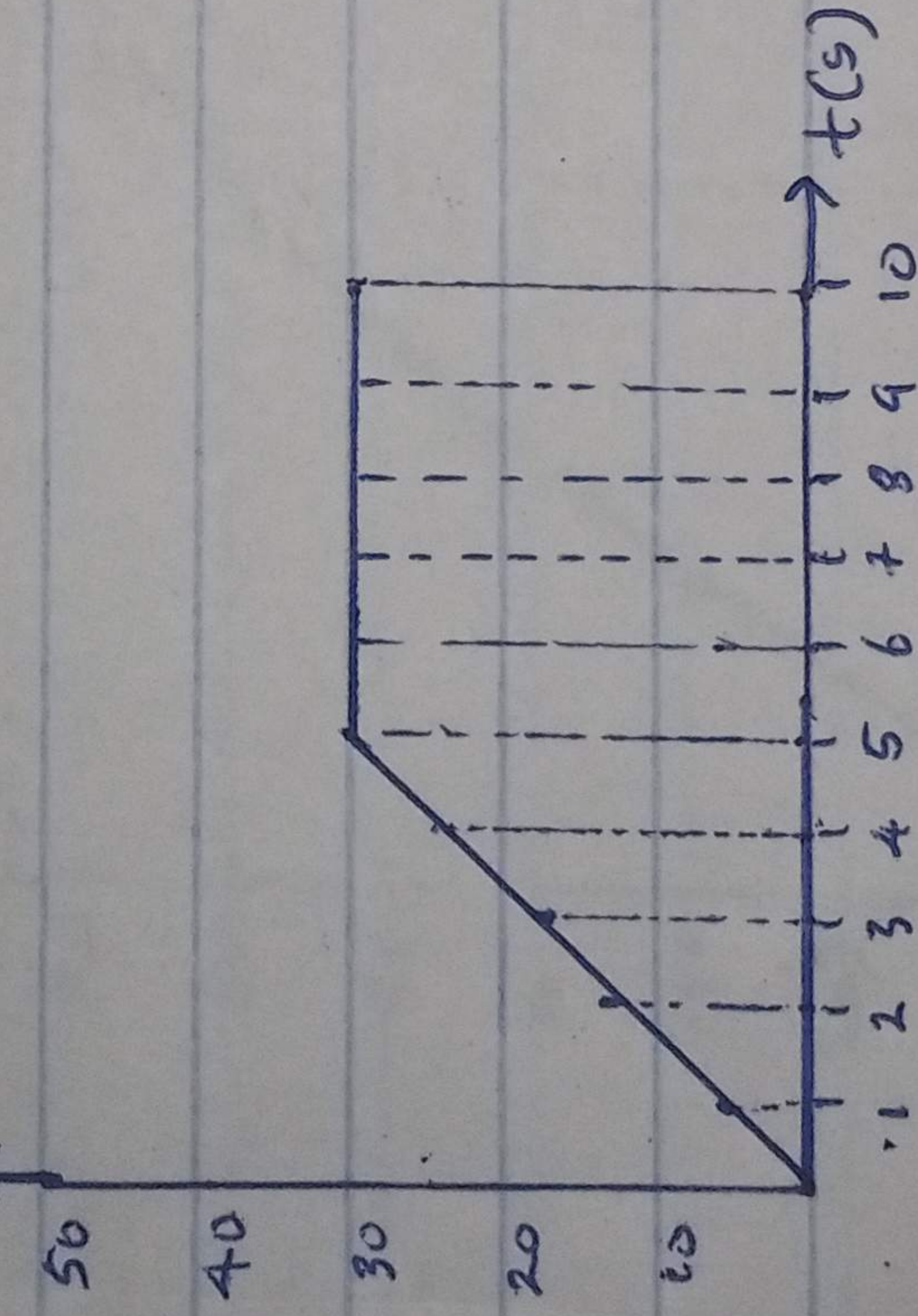
for $t = 0 \rightarrow 5$, $s = 3t^2$

$$v = 6t$$

for $t = 5 \rightarrow 10$ (s) , $s = 30t - 75$

$$v = 30$$

Velocity-time graph

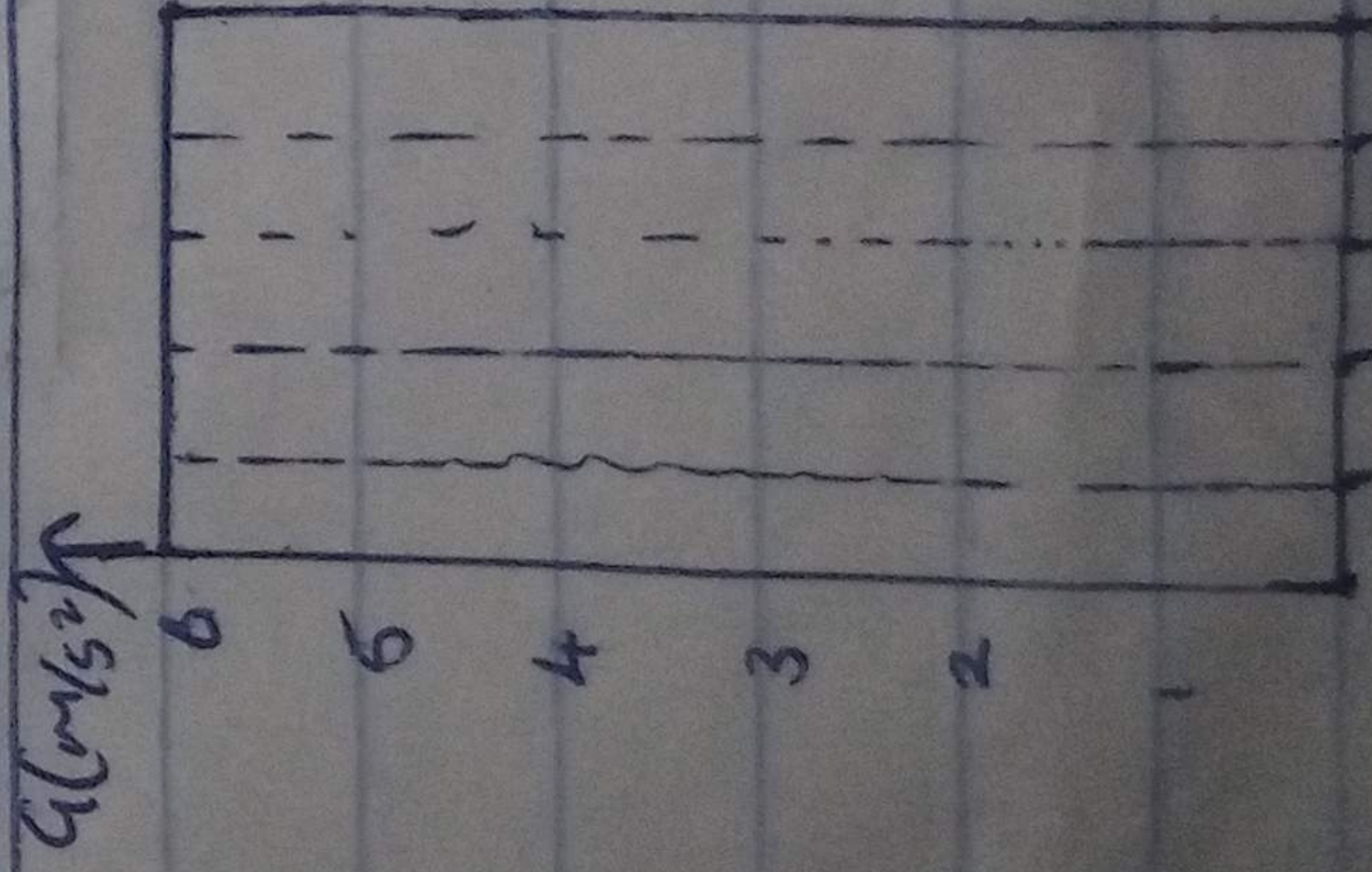


V-t graph

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

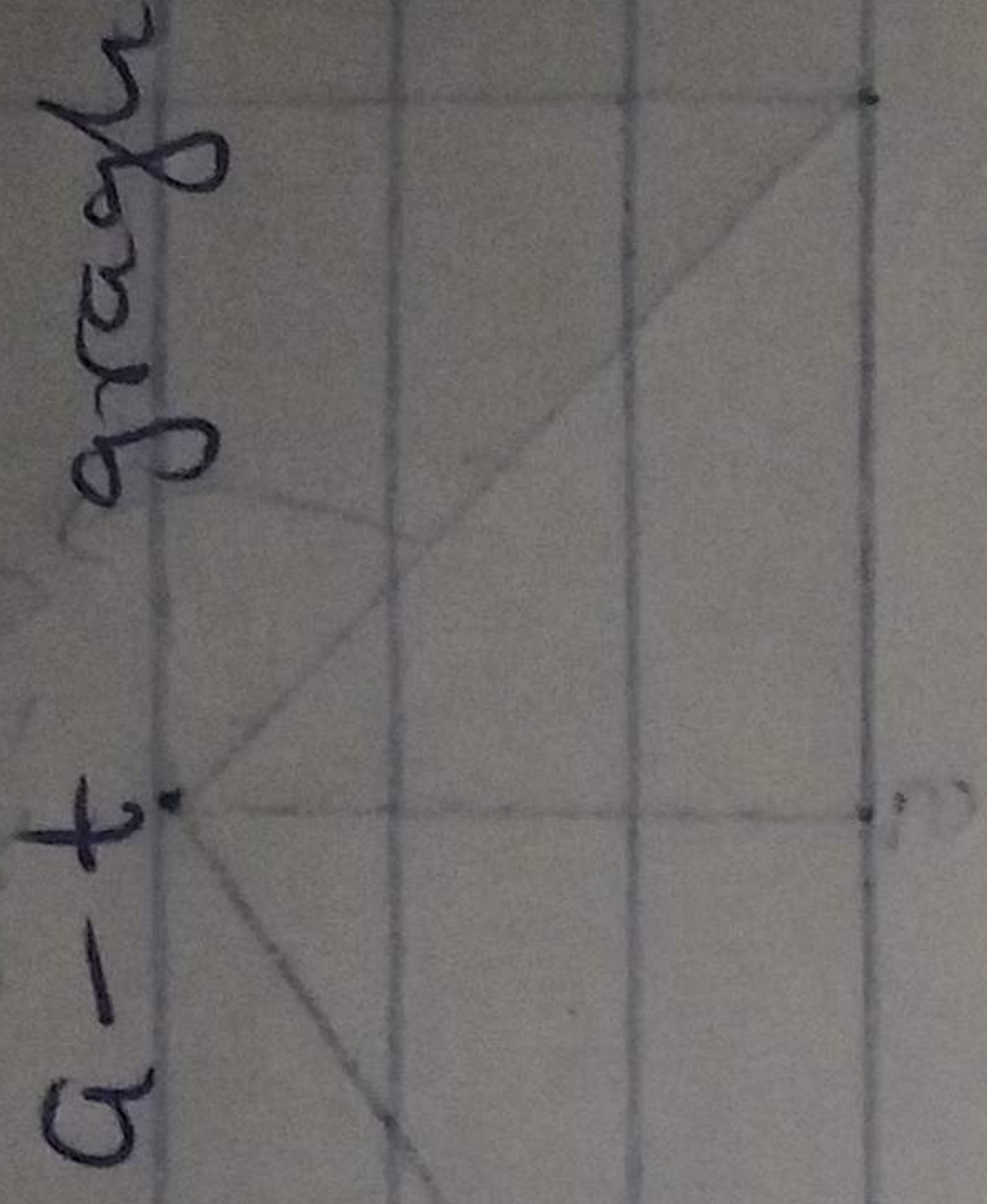
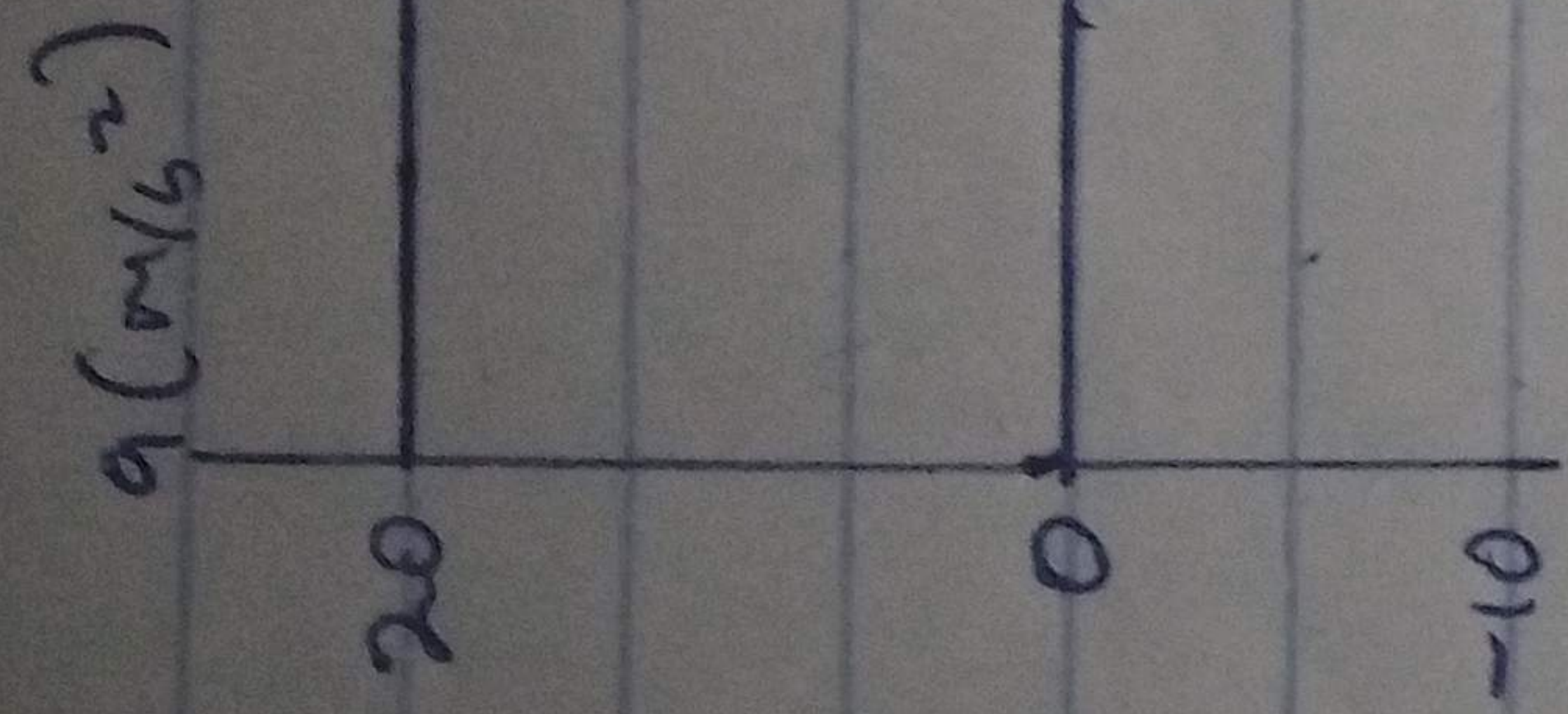
\therefore for $t = 0 \rightarrow 5$ (s) , $a = 6$
for $t = 5 \rightarrow 10$ (s) , $a = 0$

Acceleration-time graph



a-t graph

5



for $t=0 \rightarrow 5(s)$, $a=20$
 for $t=5 \rightarrow 10(s)$, $a=-10$

$$dv = a dt$$

at $t=0$, $v=0$

$$\int_{v_0}^v dv = \int_{t_0}^t a dt$$

$$\int_0^v dv = \int_0^5 20 dt$$

Initial condition = $t=5$, $v=100$

$$\int_{v_0}^v dv = \int_{t_0}^t a dt$$

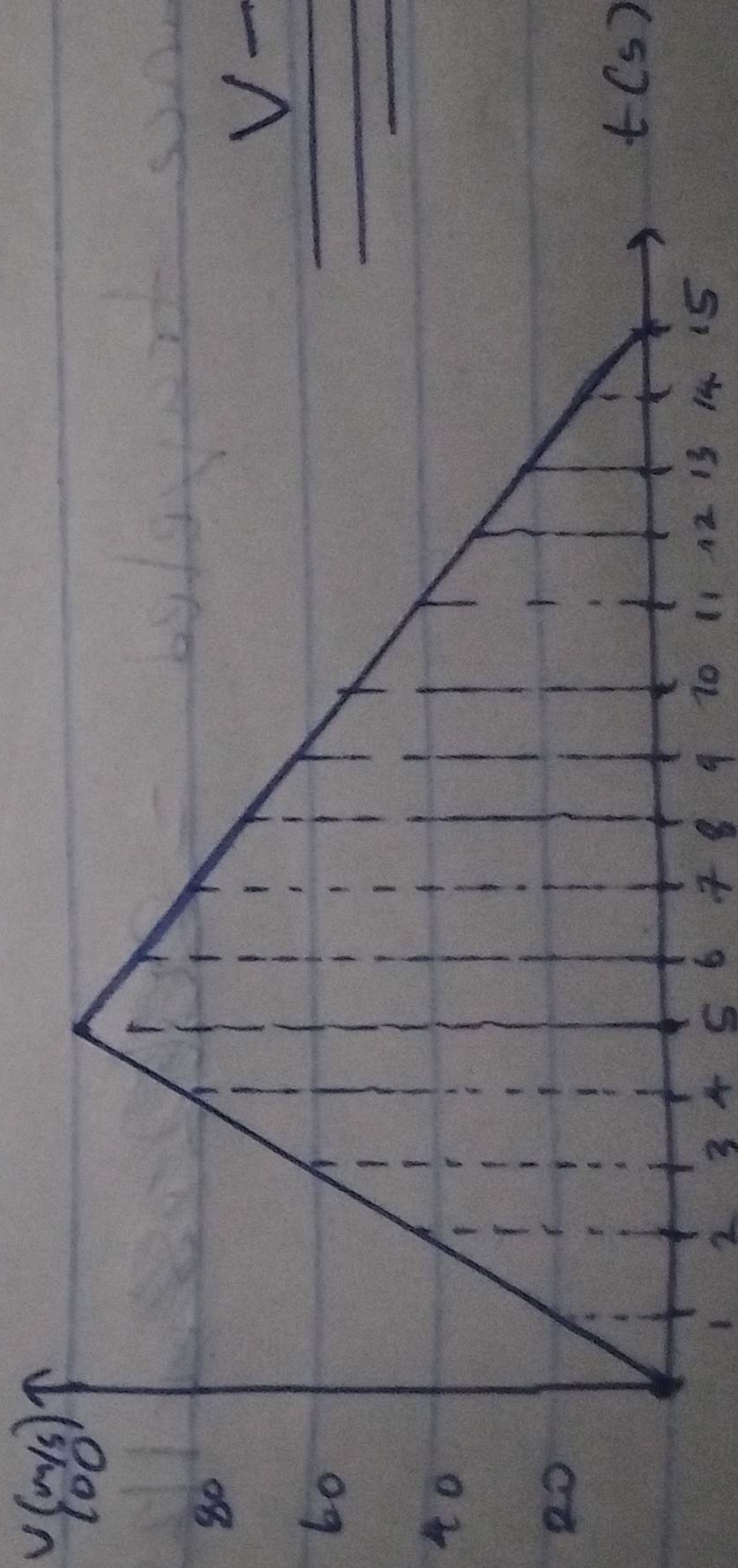
$$\int_{100}^v dv = \int_5^{t'} -10 dt$$

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

$$0 = -10t' + 150$$

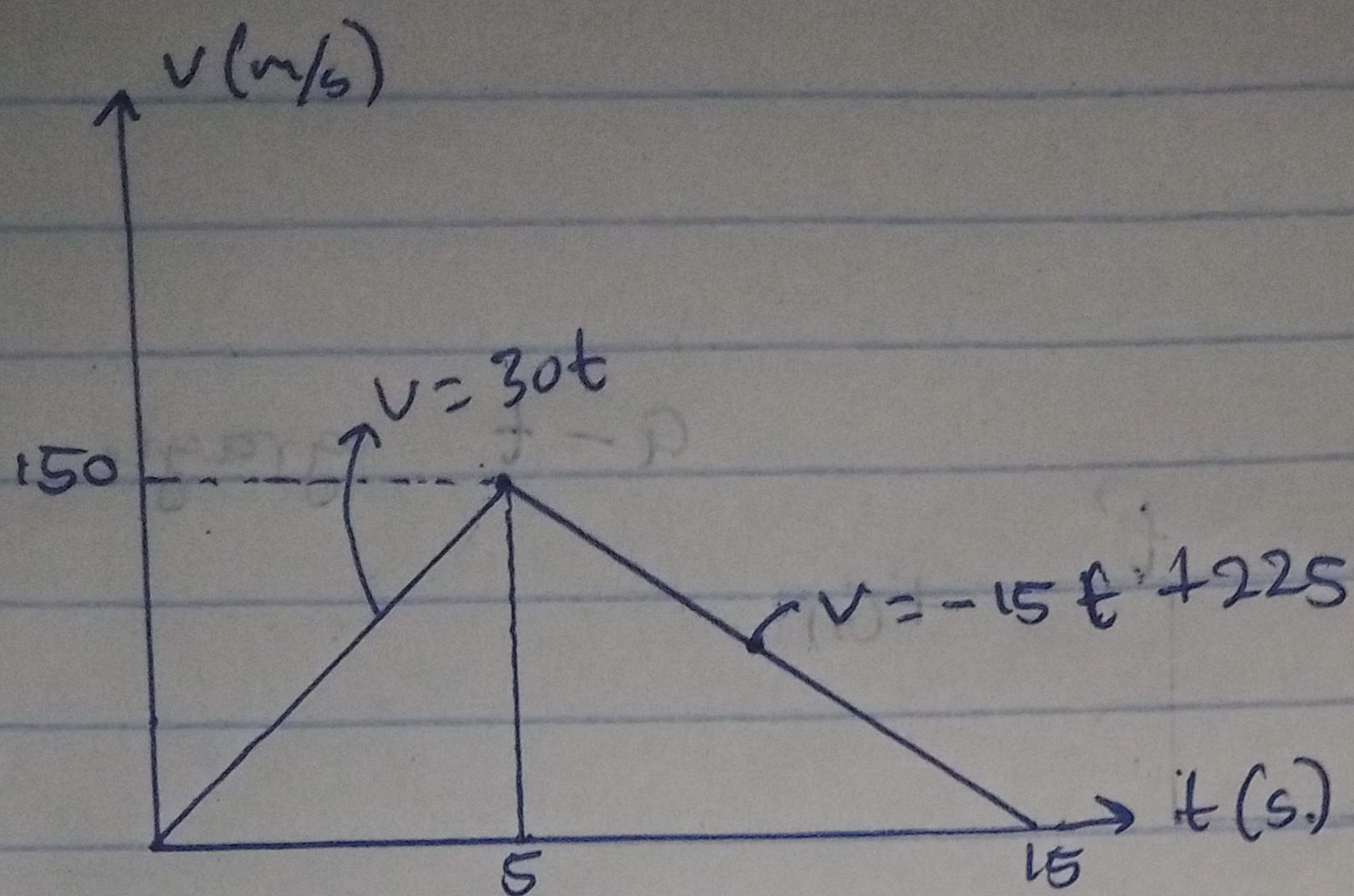
$$-150 = -10t', \quad t' = 15(s)$$

velocity-time graph



V-t graph

6



$v = 30t$ from $0 - 5(s)$

$s = \int v$, $s = \int 30t$, $s = \frac{30t^2}{2}$, $s = 15t^2 + s_0$
 $s = 15t^2$

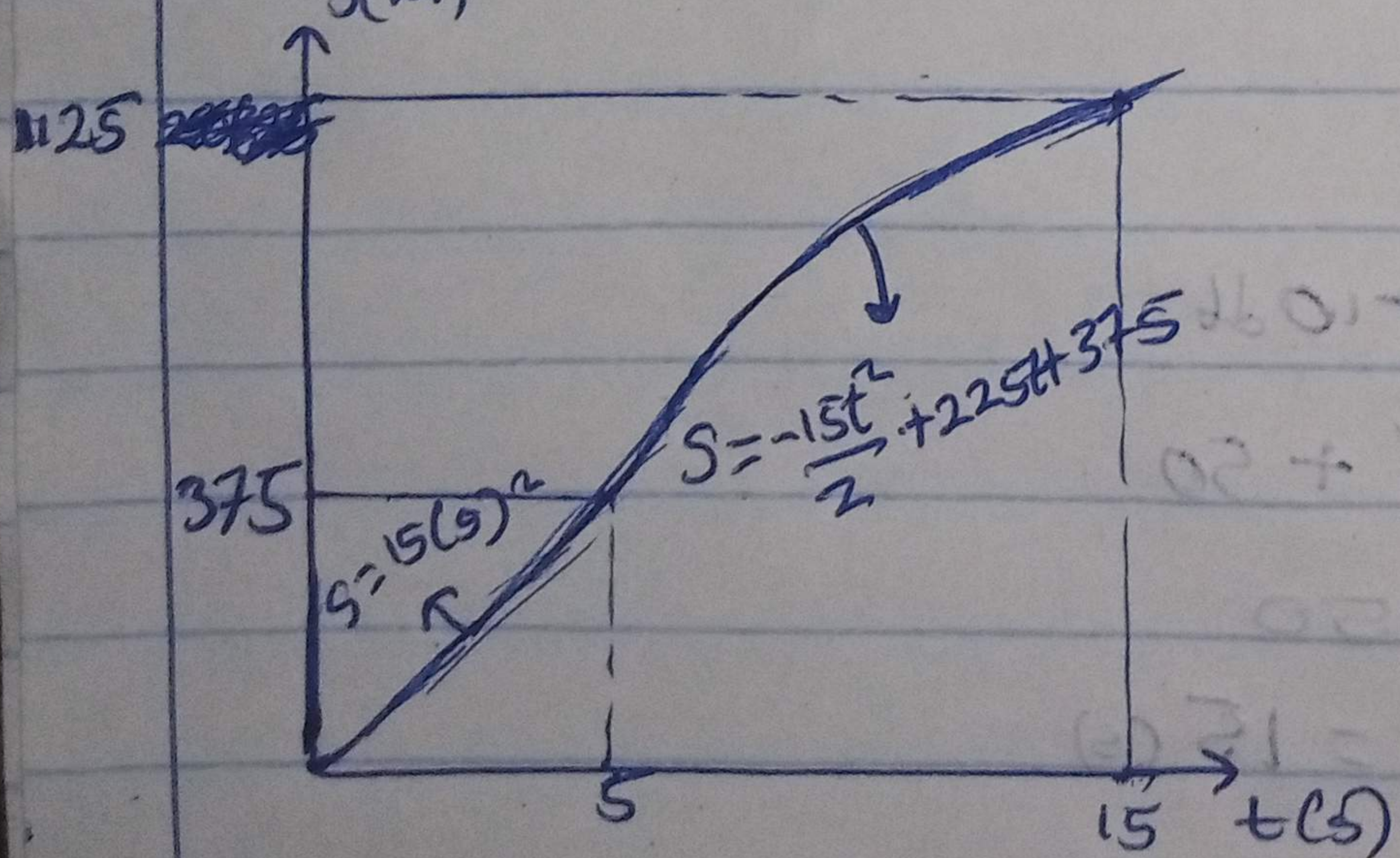
for $t = 5(s) \rightarrow 15(s)$

$v = -15t + 225$

$s = \int -15t + \int 225$

$s = \frac{-15t^2}{2} + 225t$, $s - 375 = 1687.5 - 937.5$

at $t = 5(s)$, $s = 15(5)^2$ | at $t = 15(s)$, ~~$s = \frac{15t^2}{2} + 225t + 375$~~
 $s = 375m$ | ~~$s = 7062.5m$~~ $s = 1125m$



s-t graph

total distance traveled = ~~2062.5m~~ 1125m