

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

$$v = 1.5t^2$$

at  $t = 6s$

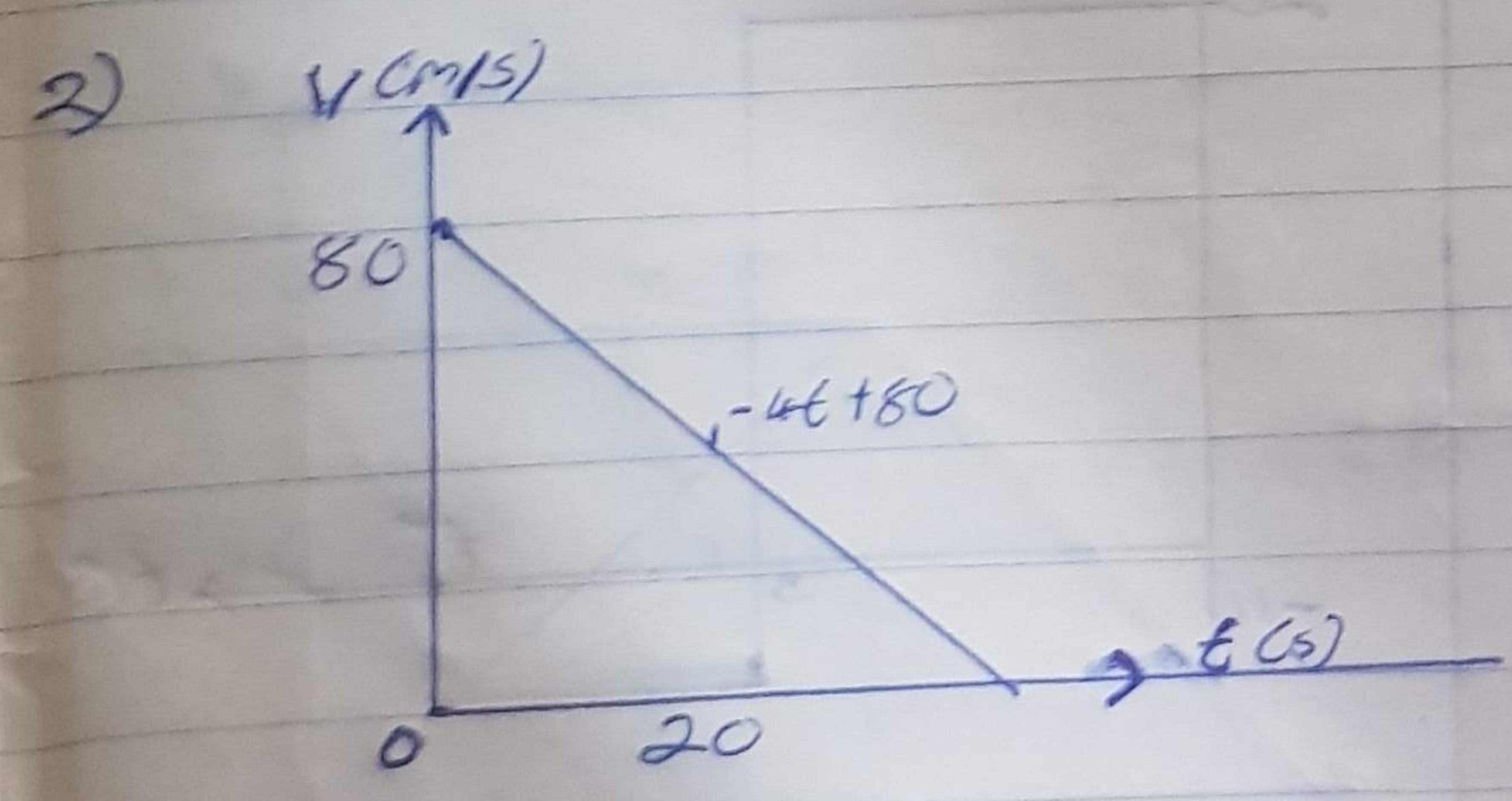
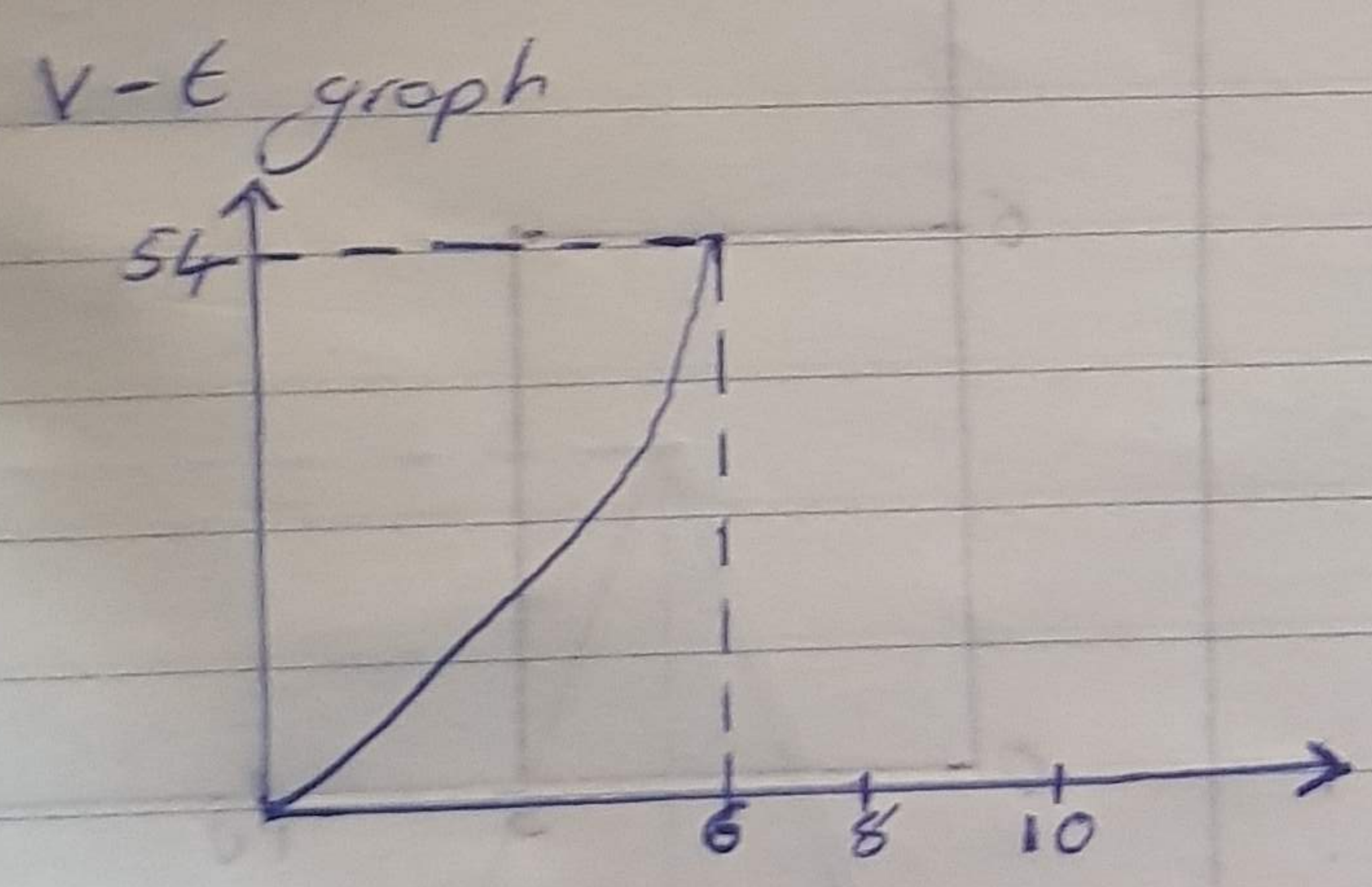
$$v = 1.5 \times 6^2$$

$$= 1.5 \times 36$$

$$v = 54 \text{ m/s}$$

From  $t = 6s - 10s$ ,  $s = 108$

$$\therefore v = 0$$



i)  $s = \int v dt$

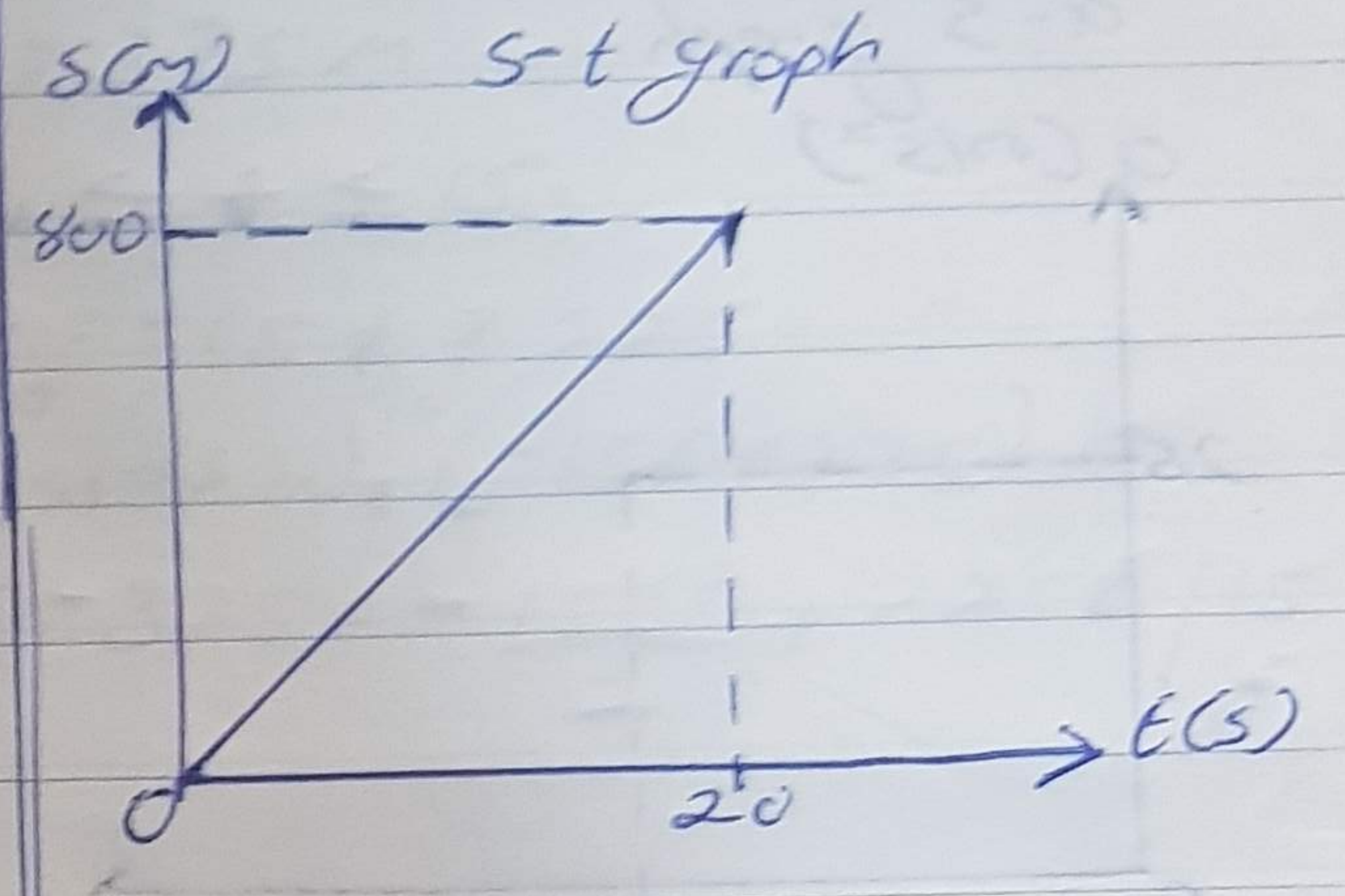
$$s = \int (-4t + 80) dt$$

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

at  $t = 20s$

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

$$s = 1600 - 800 = 800 \text{ m}$$

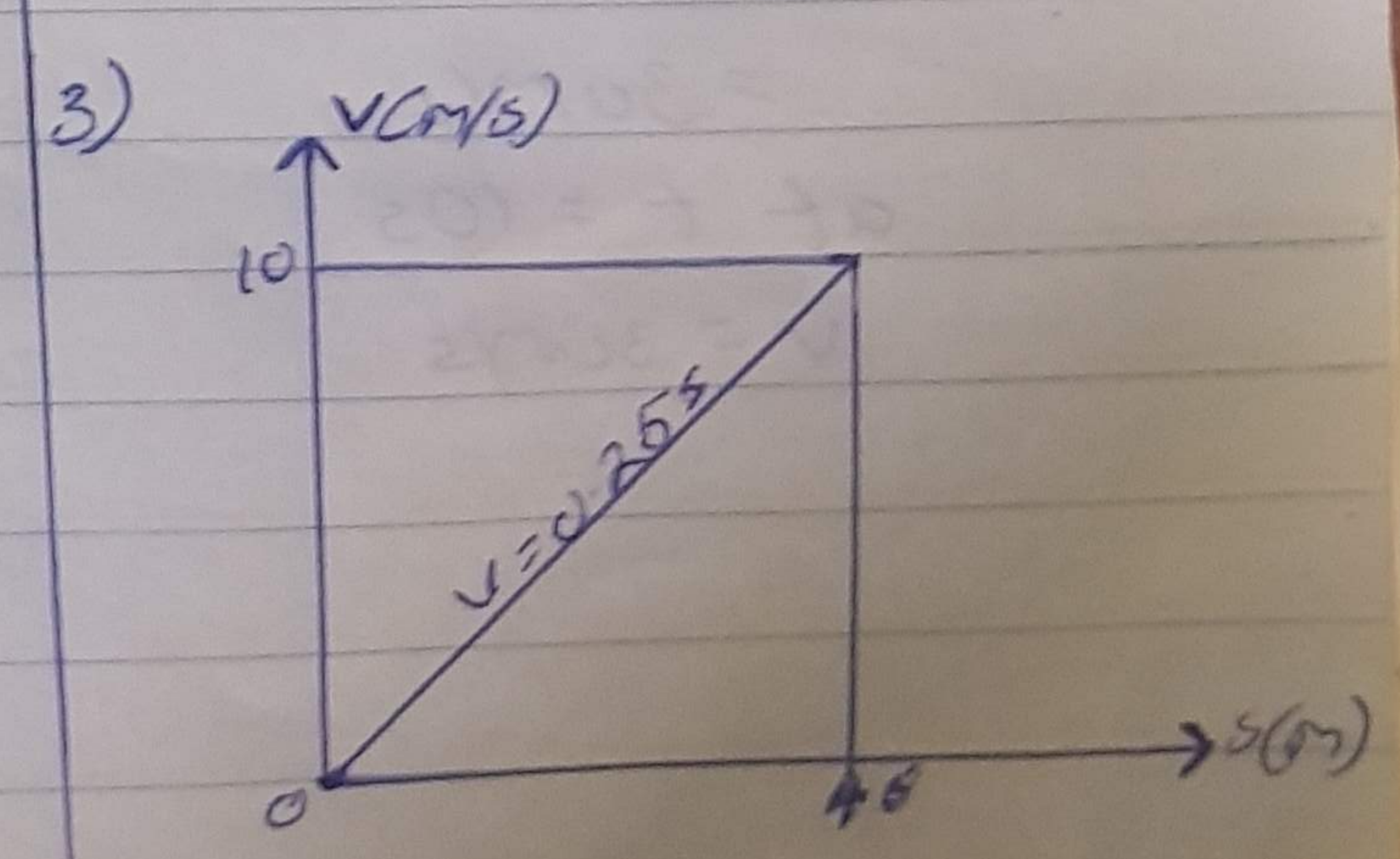
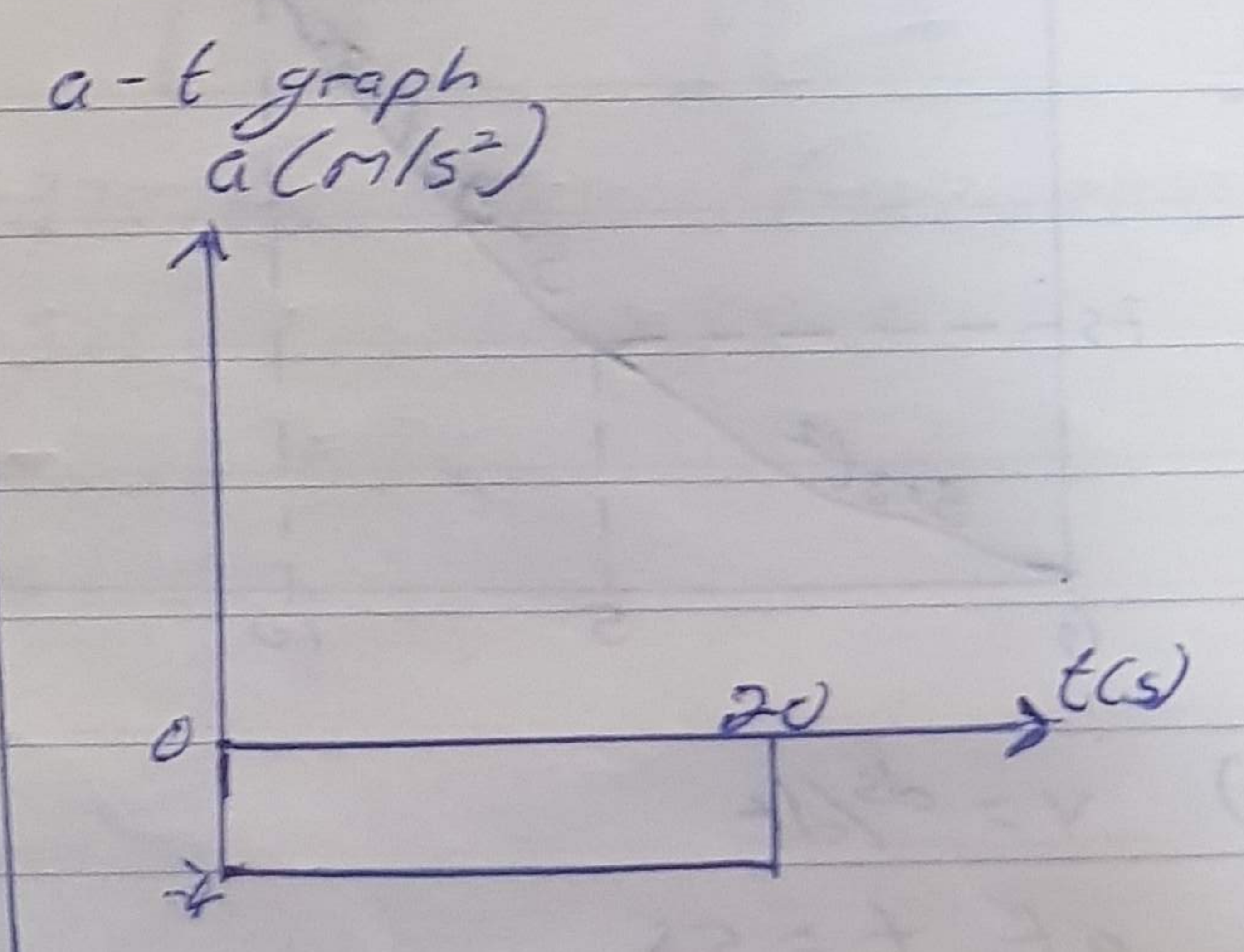


ii) acceleration

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

$$\therefore a = -4 \text{ m/s}^2$$

at  $t = 20$ ,  $a = -4 \text{ m/s}^2$



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

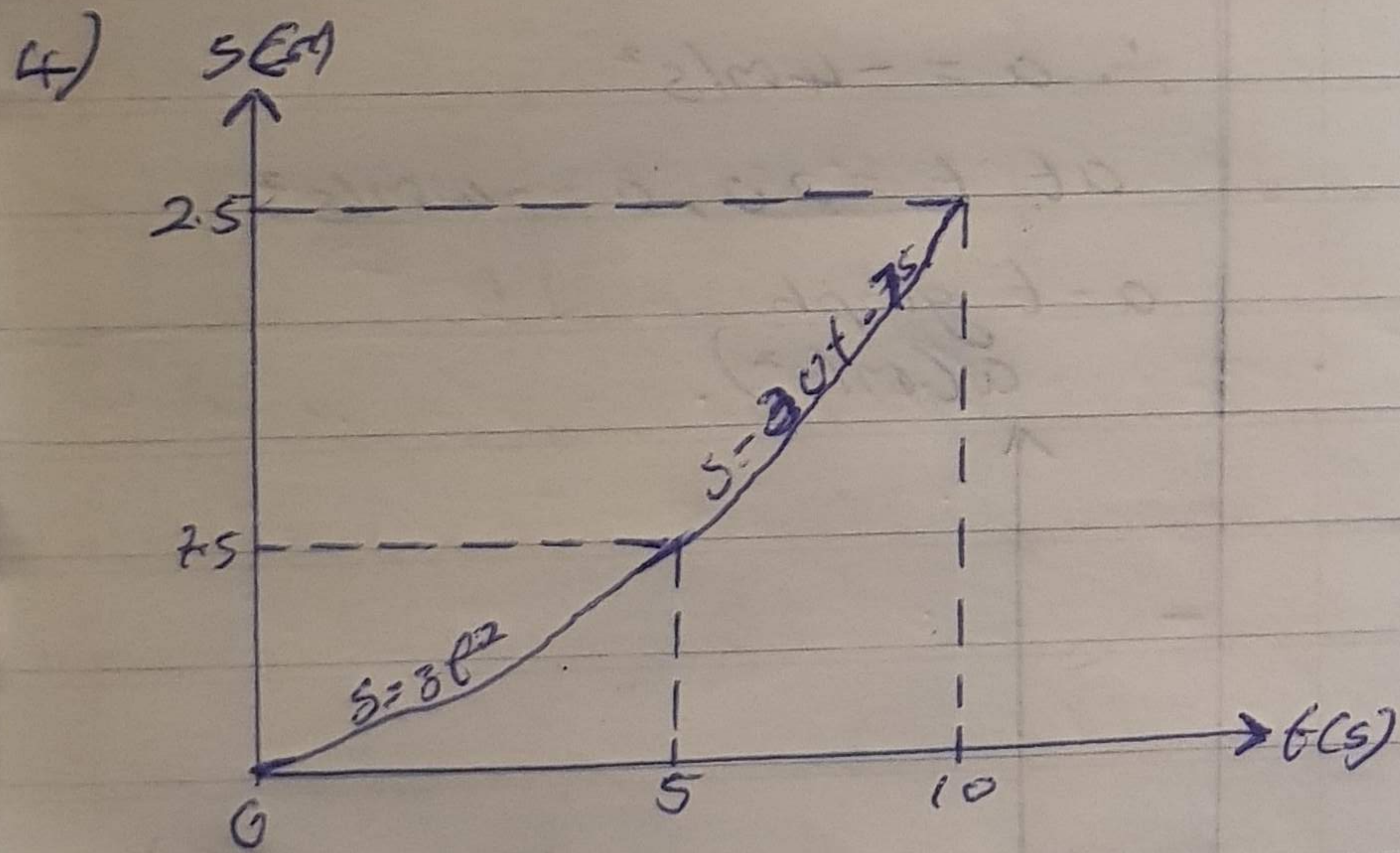
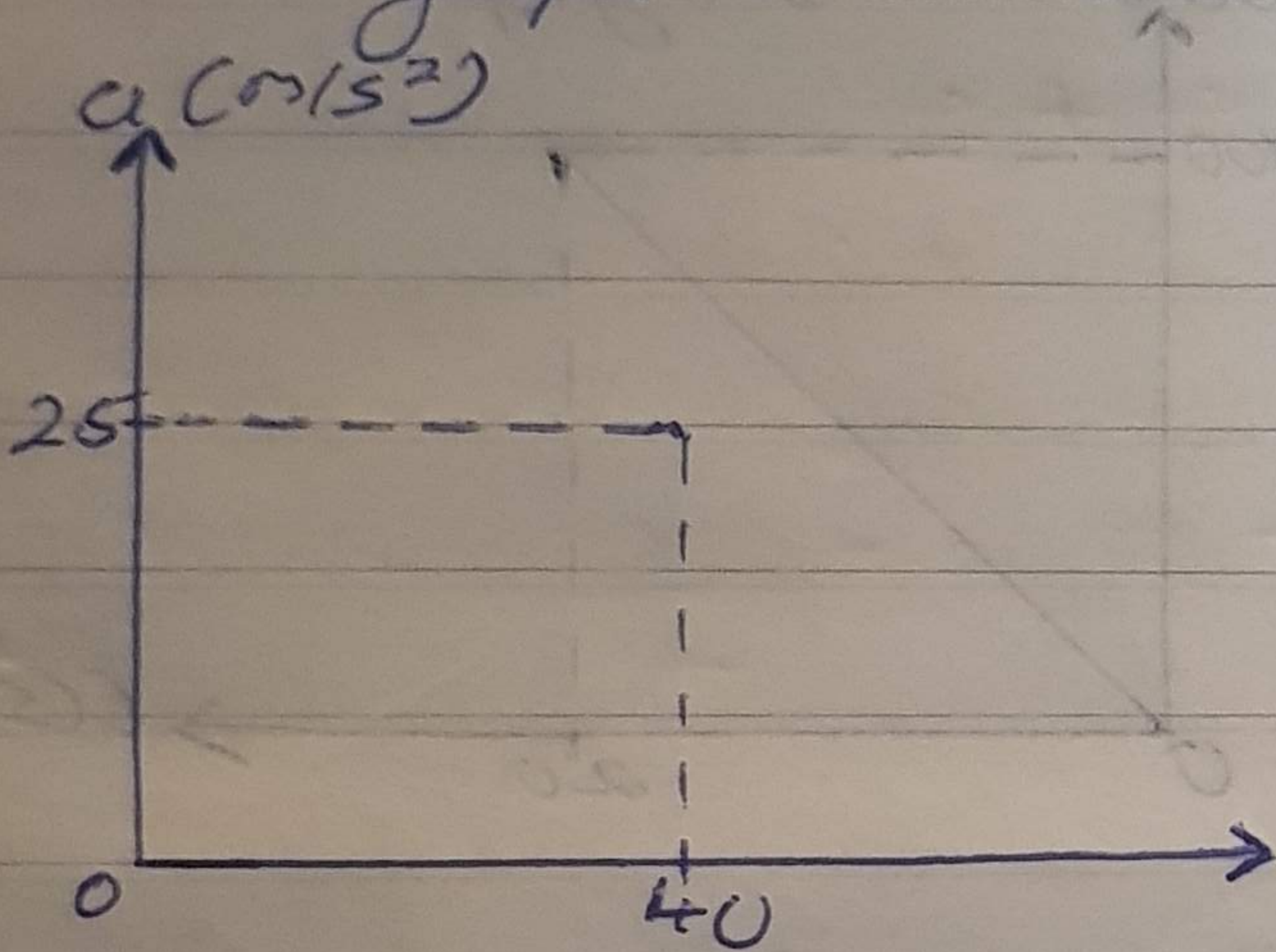
$$v = 0.25s$$

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

$$a = 10 \times 0.25$$

$$a = 2.5 \text{ m/s}^2$$

a-s graph



$$1) v = ds/dt$$

$$\text{at } t = 5s$$

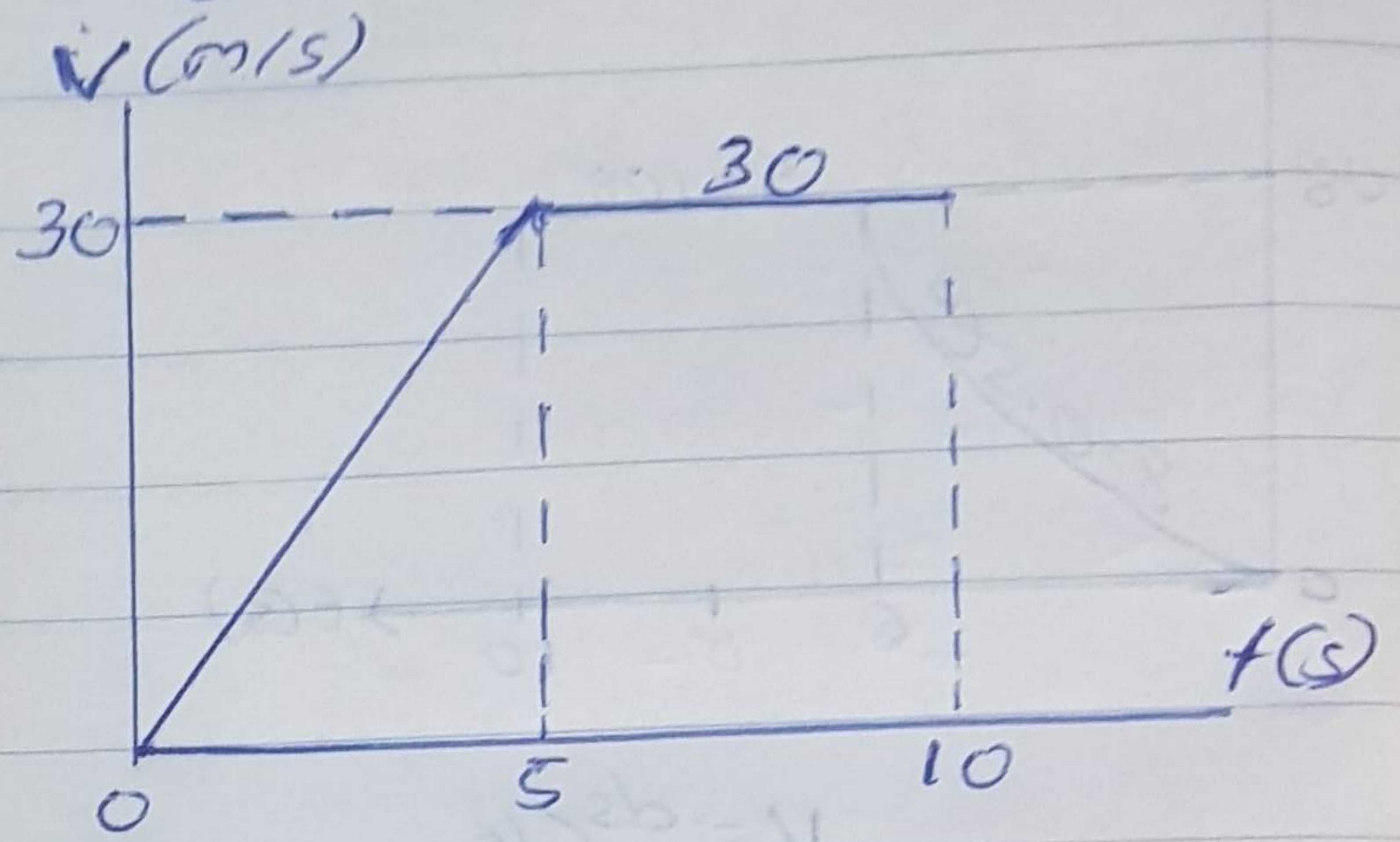
$$v = 6t = 6 \times 5$$

$$= 30 \text{ m/s}$$

$$\text{at } t = 10s$$

$$v = 30 \text{ m/s}$$

v-t graph



$$1) a = dv/dt$$

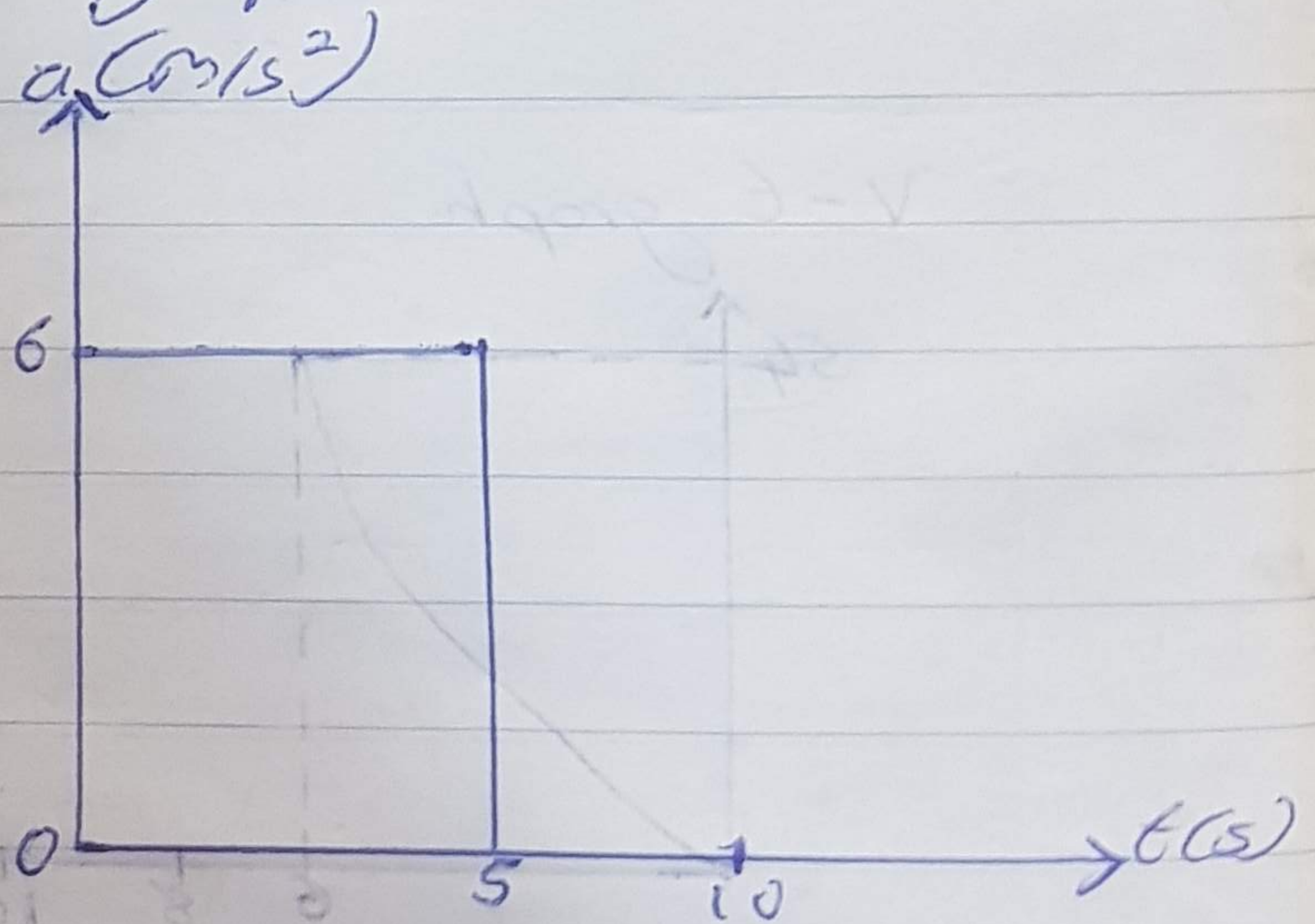
$$\text{at } t = 5s$$

$$a = 6 \text{ m/s}^2$$

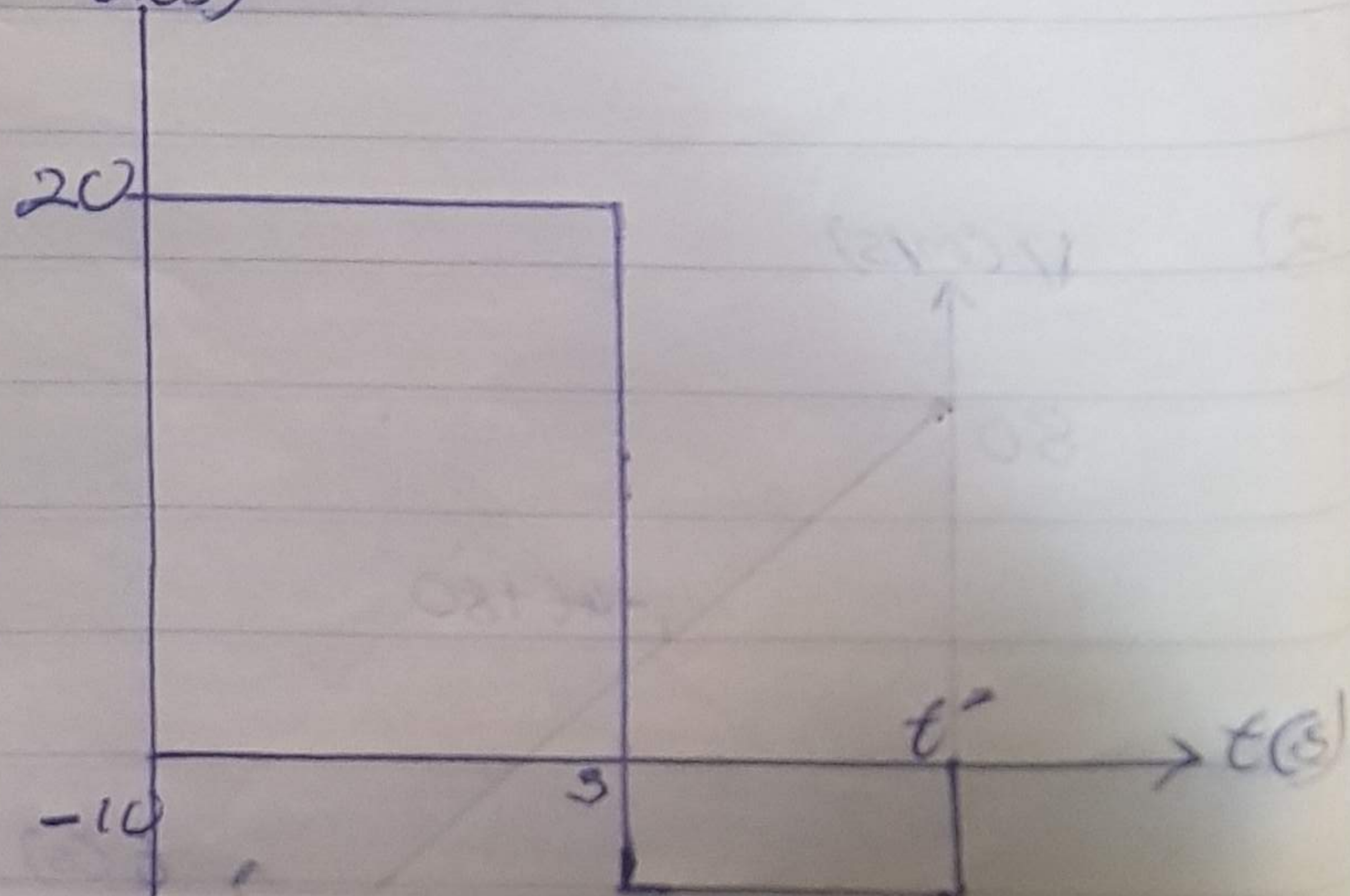
$$\text{at } t = 10s$$

$$a = 0 \text{ m/s}^2$$

a-t graph



5) a(s)



$$1) v = \int a dt$$

$$v = \int 20 dt$$

$$v = 20t$$

$$\text{at } t = 5s$$

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

$$5s < t \leq t'$$

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

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

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

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

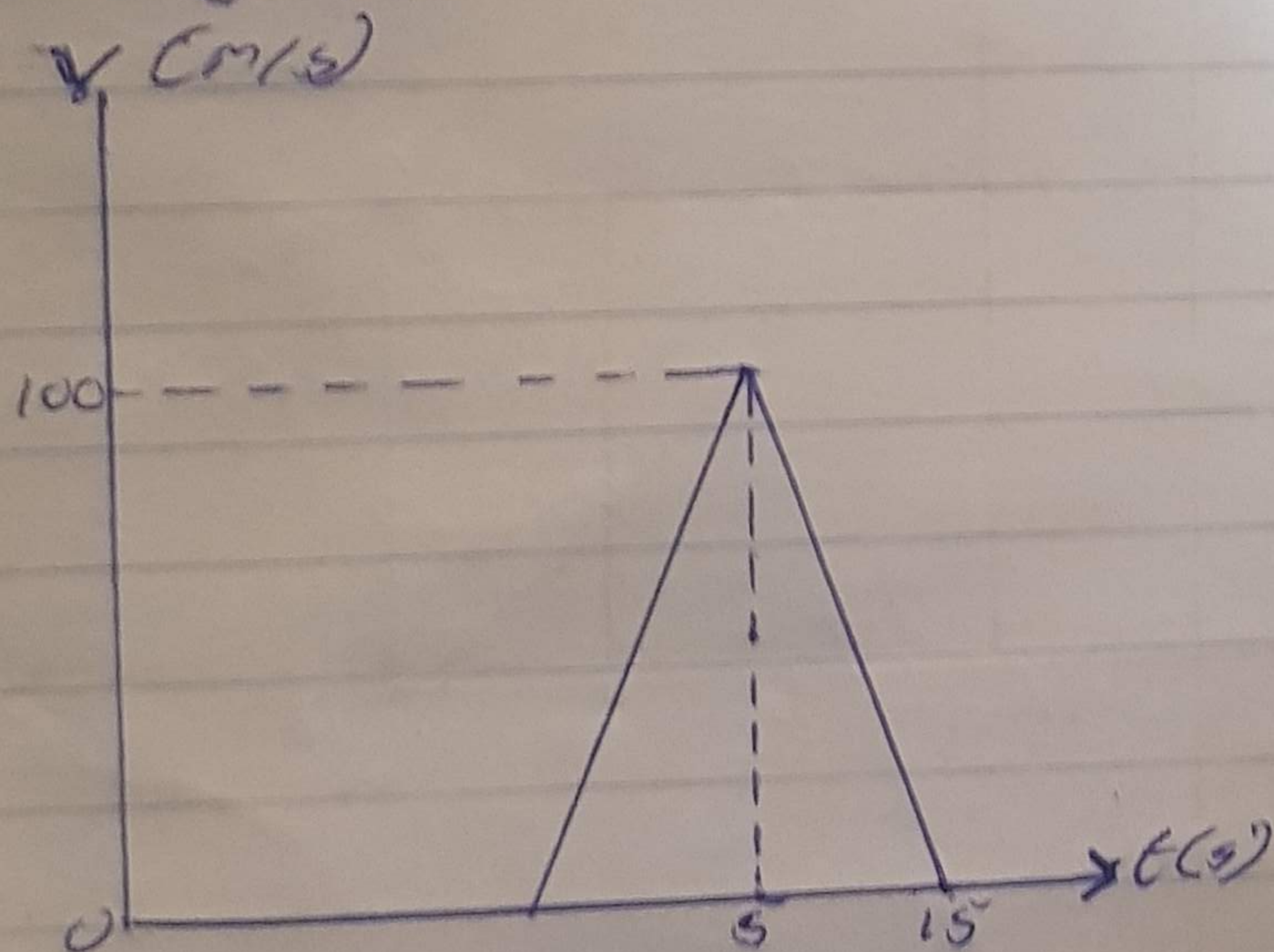
$$\text{at } t', v = 0$$

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

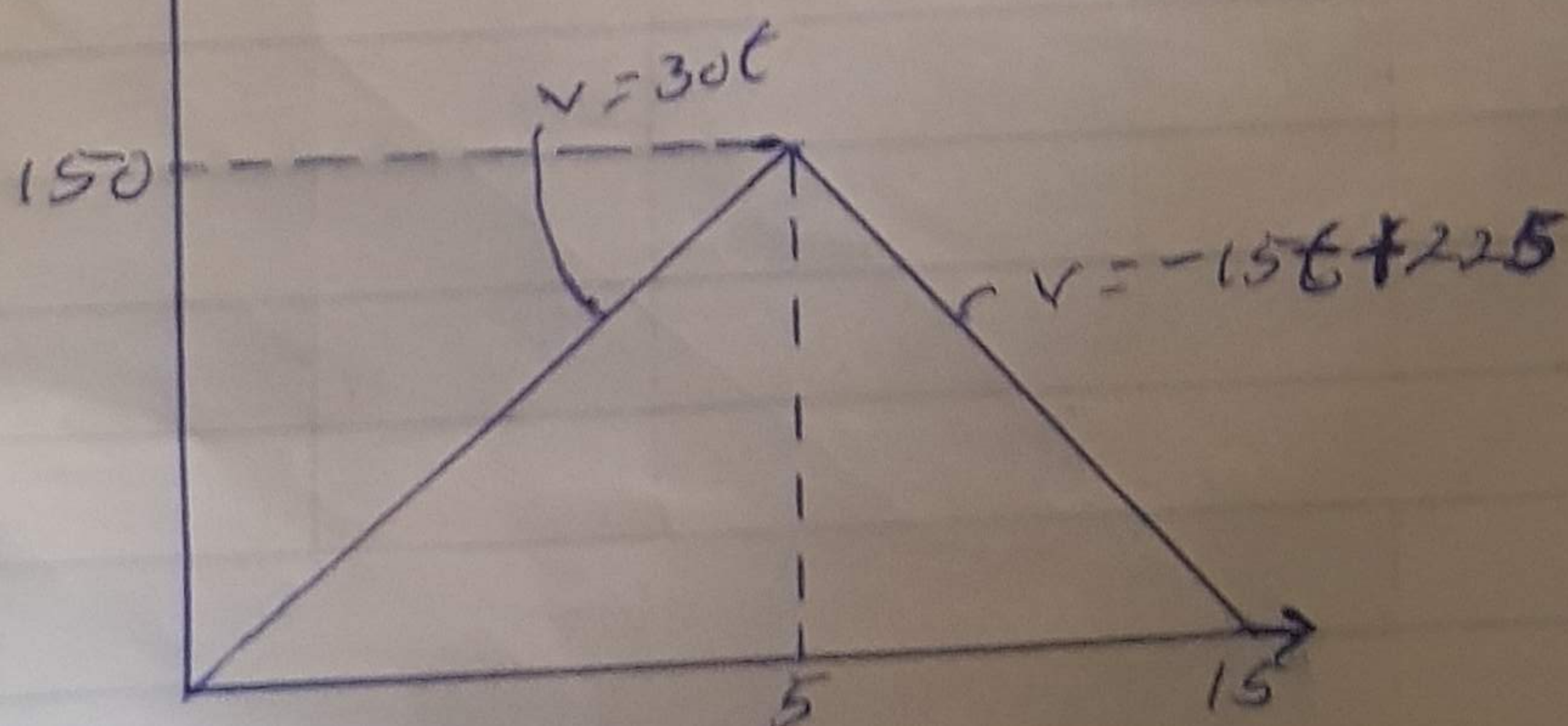
$$10t' = 150$$

$$t' = 15s$$

v-t graph



6)  $v(m/s)$



$$0 \leq t \leq 5s$$

$$v = 30t$$

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

$$s = 15t^2/5$$

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

$$s = 15 \times 25$$

$$s = 375 \text{ m}$$

$$5s \leq t \leq 15s$$

$$v = -15t + 225$$

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

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

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

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

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

$$s - 375 = +1687.5 - 937.5$$

$$s - 375 = 750$$

$$s = 1125 \text{ m}$$