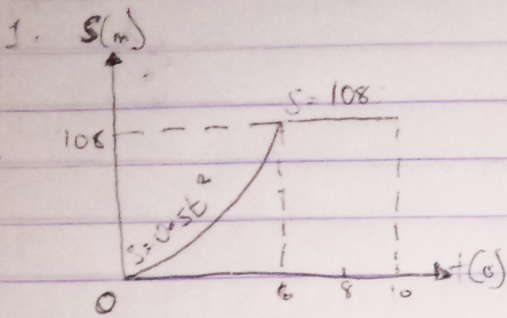


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Answers:



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

$$v = 1.5t^2$$

$$\text{at } t = 6s$$

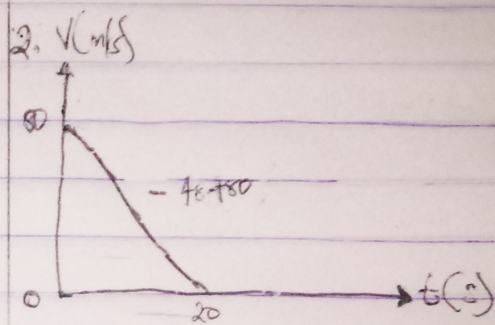
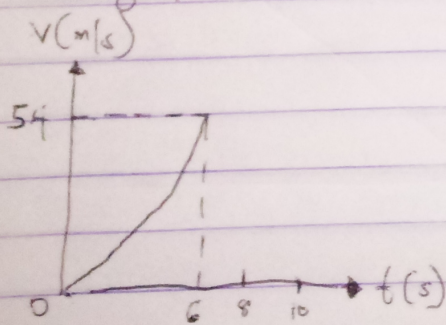
$$v = 1.5 \times 6^2$$

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

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

$$\therefore v = 0$$

$v-t$  graph.



$$s = \int v dt$$

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

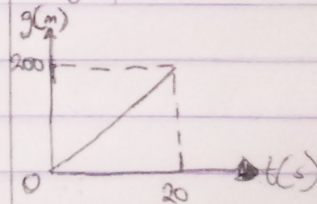
$$s = -2t^2 + 80t$$

$$\text{at } t = 20s$$

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

$$s = 1600 - 800 = 800m$$

$s-t$  graph.

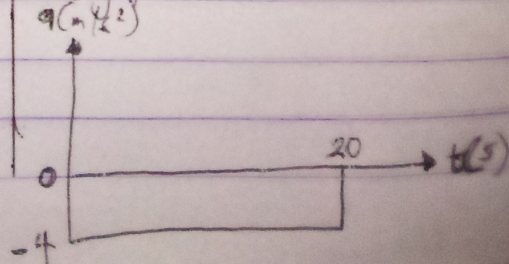


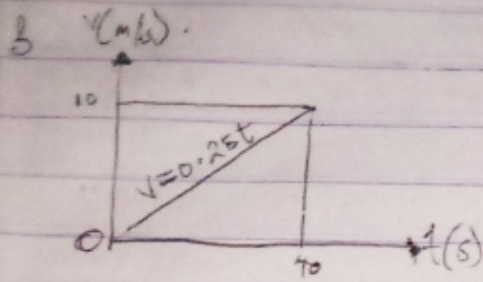
ii) Acceleration

$$a = \frac{dv}{dt} : a = -4 \text{ m/s}^2$$

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

$a-t$  graph





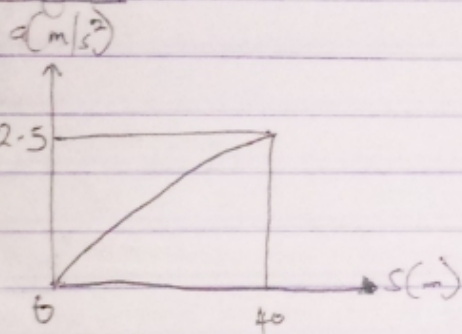
$$a = \left(\frac{dv}{ds}\right)v$$

$$v = 0.25s$$

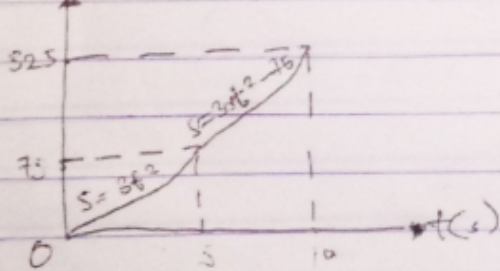
$$a = 10 \times 0.25 / ds$$

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

$a-s$  graph.



4.  $s$  (m)



$$v = ds/dt$$

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

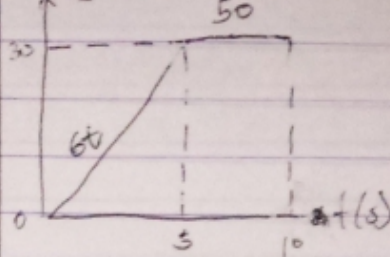
$$v = 6t = 6 \times 5$$

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

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

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

$v-t$  graph



$$i) a = dv/dt$$

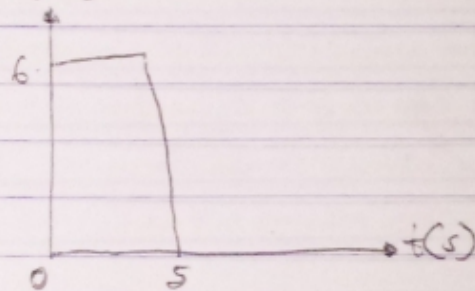
$$\text{at } t = 5s$$

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

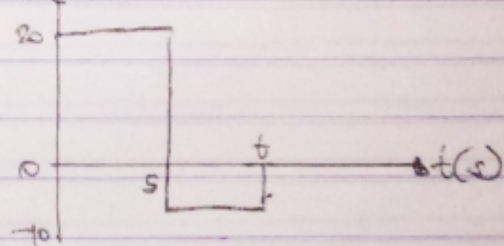
$$\text{at } t = 10s$$

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

$a$  (m/s<sup>2</sup>)



5.  $v$  (m/s)



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

$$v = \int 20 dt$$

$$v = 20t$$

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

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



$$5 \leq t \leq 15$$

$$\int_5^{t_1} dv = \int_5^{t_1} -10 dt$$

$$v - 100 = 10t \Big|_5^{t_1}$$

$$v = 100 = -10t_1 + 10(5)$$

$$v - 100 = -10t_1 + 50$$

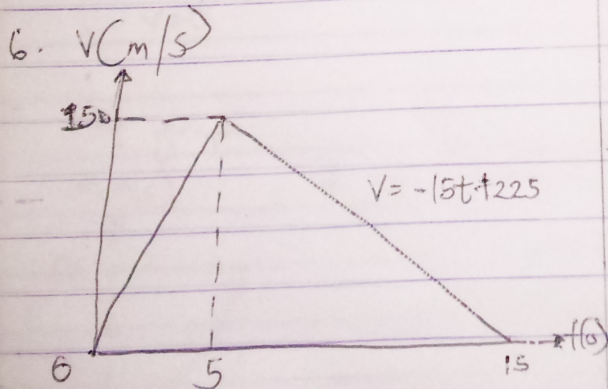
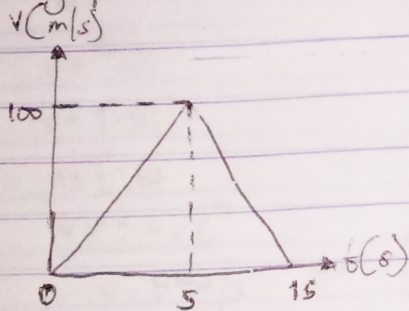
at  $t_1$ ,  $v = 0$

$$0 - 100 = -10t_1 + 50$$

$$10t_1 = 150$$

$$t_1 = 15s$$

v-t graph.



$$0 \leq t \leq 5$$

$$v = 30t$$

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

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

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

$$s = 15 \times 25 = 375m$$

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

$$v = -15t + 225$$

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

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

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

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

$$s - 375 = \left[ -1687.5 + 3375 \right] - \left[ -187.5 + 1125 \right]$$

$$s - 375 = (1687.5 - 937.5)$$

$$s - 375 = 750$$

$$s = 375 + 750$$

$$s = 1125m$$

s-t graph.

