

O BEMBE TOMILAYO

18/ENG001050 MECTIAADIA
GRAPH

9) Since $v = \frac{ds}{dt}$ the $v-t$

graph can be determined by differentiating the equation

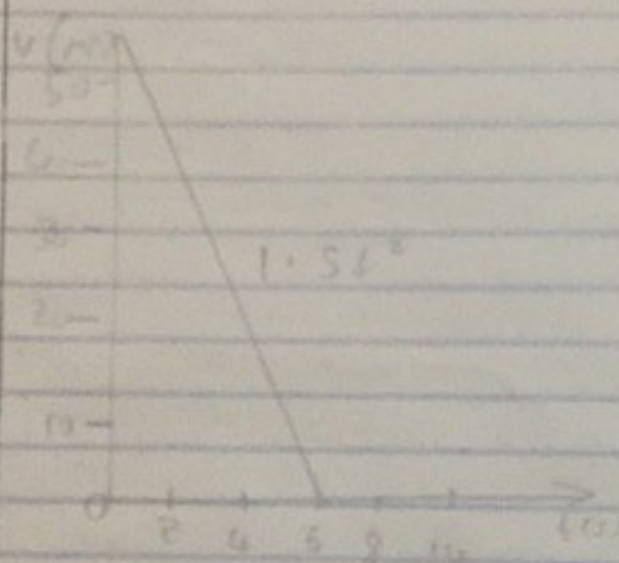
$$0 \leq t < 6s, S = 0.5t^2$$

$$v = \frac{ds}{dt} = 1.5t \text{ m/s}$$

$$= 5.4 \text{ m/s}$$

$$6 \leq t < 10s, S = 10.8$$

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



GRAPH

10) $S-t$ graph

The $S-t$ graph is determined by integrating the equation

$$0 \leq t < 20, v = -4t + 80$$

$$\int_0^S ds \geq \int_0^t -4t + 80$$

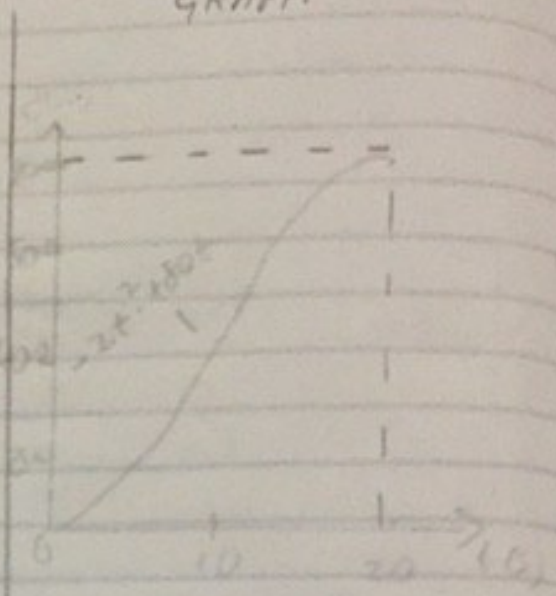
$$S = -2t^2 + 80t$$

When $t = 20$

$$= -2(20)^2 + 80 \times 20$$

$$= -800 + 1600$$

$$= 800 \text{ m}$$



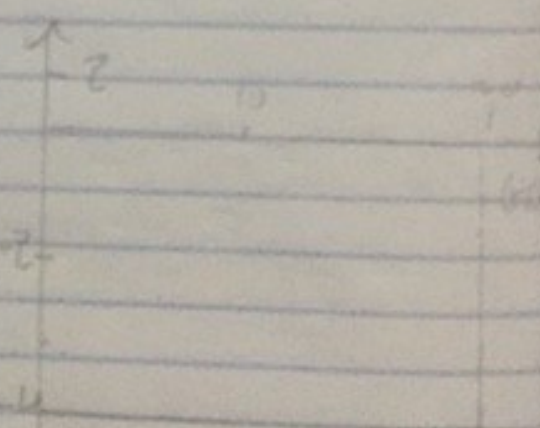
$a-t$ graph

the $a-t$ graph is determined by differentiating the equation

$$0 \leq t < 20s, v = -4t + 80$$

$$a = \frac{dv}{dt} = -4$$

a (m/s²)



11) With the value of v and $\frac{dv}{dt}$ known, the value of 'a' can be calculated

$$0 \leq S$$

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

$$v = 10$$

$$a = v$$

$$a = 10$$

$$a = 10$$

$$a \text{ (m/s}^2\text{)}$$

$$n$$

$$2.5$$

$$2$$

$$1$$

$$2$$

$$1$$

$$2$$

$$1$$

$$2$$

$$1$$

$$2$$

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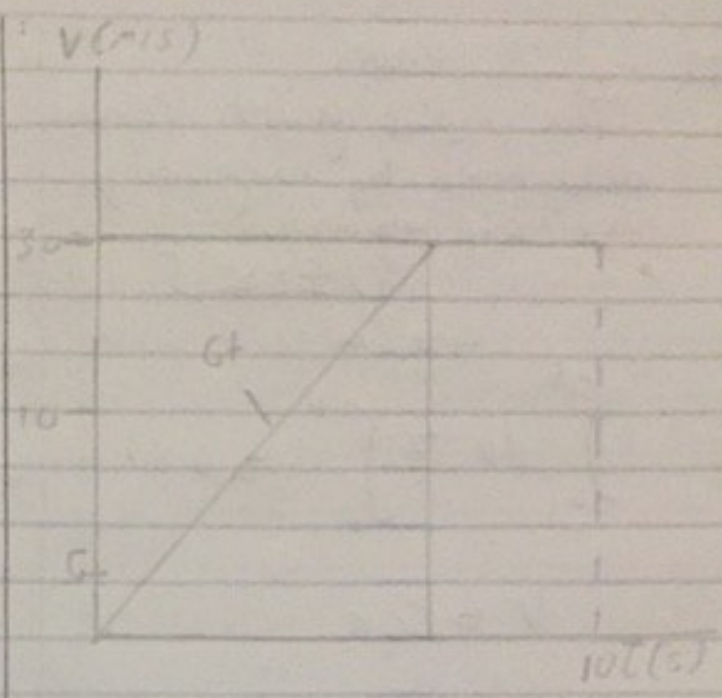
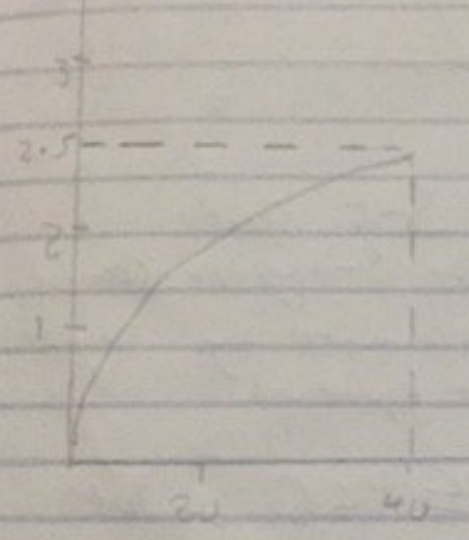
$$1$$

$$2$$

$0 \leq s < 40$
 $\frac{dv}{dt} = 0.25$
 $t = 0.25$

$v = 10 \text{ m/s}$
 $a = v \times \frac{dv}{ds}$
 $a = 10 \times 0.25$
 $a = 2.5 \text{ m/s}^2$

$a \text{ (m/s}^2\text{)}$ GRAPH



a-t graph

The a-t graph can be determined by differentiating the v-t equations

$0 \leq t < 5, v = 6t$
 $a = \frac{dv}{dt} = 6 \text{ m/s}^2$

$5 \leq t < 10, v = 30 \text{ m/s}$
 $a = \frac{dv}{dt} = 0 \text{ m/s}^2$

GRAPH:

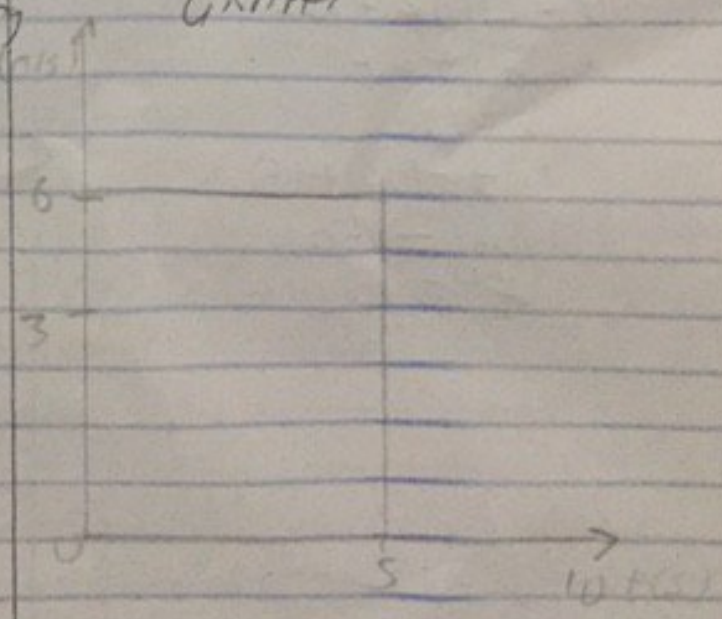
(2) v-t graph

the v-t graph can be constructed by differentiating the equations

$0 \leq t < 5, s = 3t^2$
 $v = \frac{ds}{dt} = 6t = 6(5)$
 $= 30 \text{ m/s}$

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

$v = \frac{ds}{dt} = 30 \text{ m/s}$



GRAPH

13 V-t graph

The V-t graph can be determined by integrating the a-t equations

$$0 \leq t < 5$$

$$a = 20$$

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

$$v = 20t$$

When $t = 5$

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

Using this as the initial condition for the next time period we have $5 \leq t < t'$

$$a = -10 \text{ m/s}^2$$

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

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

$$v = -10t + 150$$

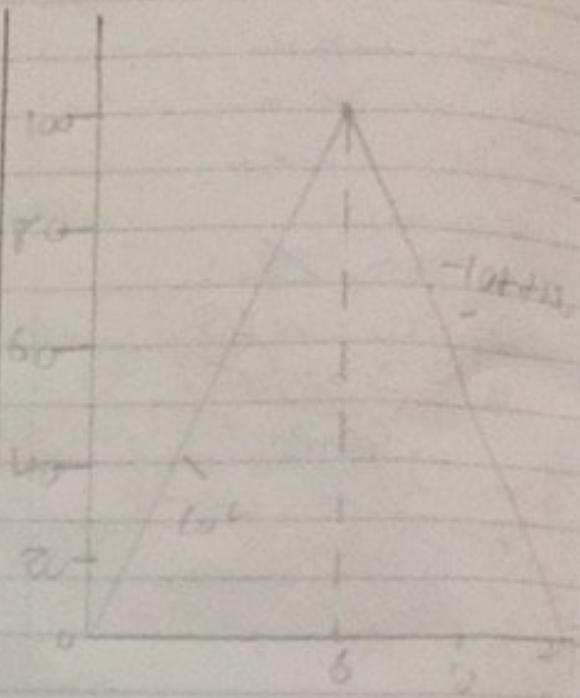
when $t = t'$

$$v = 0$$

$$0 = -10t + 150$$

$$10t = 150$$

$$t' = 15 \text{ s}$$



S-t graph

The S-t graph can be determined by integrating the equations

$$0 \leq t < 5, v = 20t$$

$$\int_0^s ds = \int_0^t 20t dt$$

$$s = 10t^2 \text{ m}$$

when $t = 5$

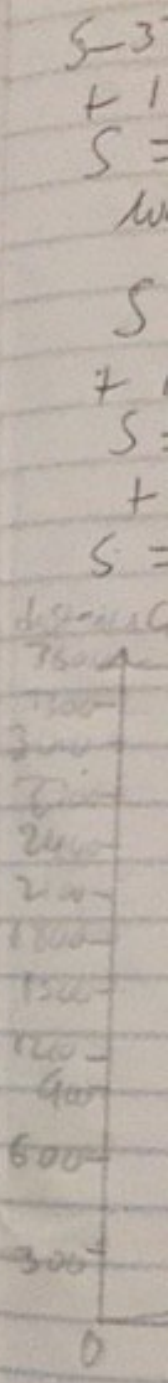
$$s = 10(5)^2$$

$$s = 250 \text{ m}$$

Using this initial conditions

$$250 \leq t < 15 \text{ s}$$

$$\int_{250}^s ds = \int_5^{t'} (-10t + 225)$$



$$S - 375 = 7.5t^2 + 225t$$

$$+ 187.5 + 1125$$

$$S = 7.5t^2 + 225t + 1687.5$$

When $t' = 15.5$

$$S = 7.5(15)^2 + 225(15)$$

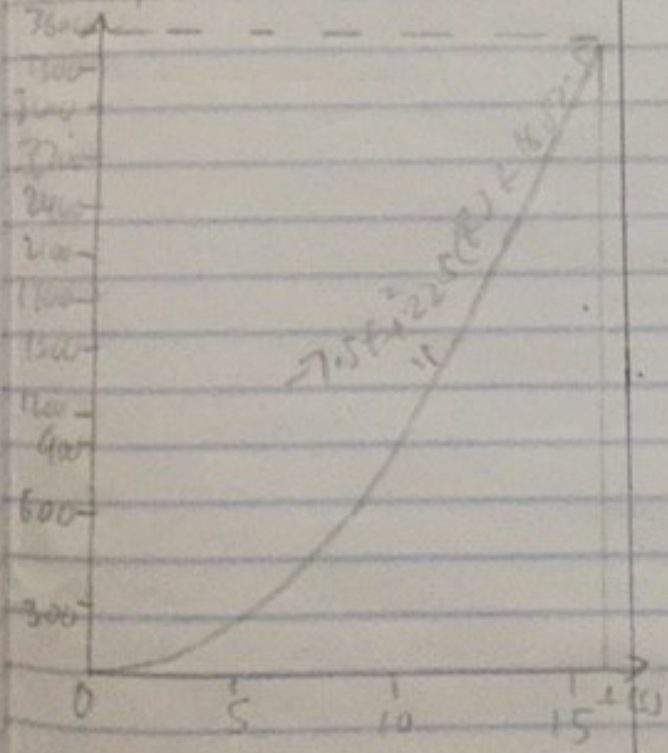
$$+ 1687.5$$

$$S = -1687.5 + 1687.5$$

$$+ 3 \cdot 375$$

$$S = 3 \cdot 375 \text{ m}$$

Graph



can be
integrating

ot

dt

$$-15 + 225$$