

MATRIC NUMBER: 17/MHS01/314

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DEPARTMENT: MECHANICAL ENGINEERING

COURSE: ENG 234

1. $S = 0.5 \cdot t^3$

$$V = \frac{dS}{dt}$$

At $0s < t < 6s$

$$V = 1.5 \cdot t^2$$

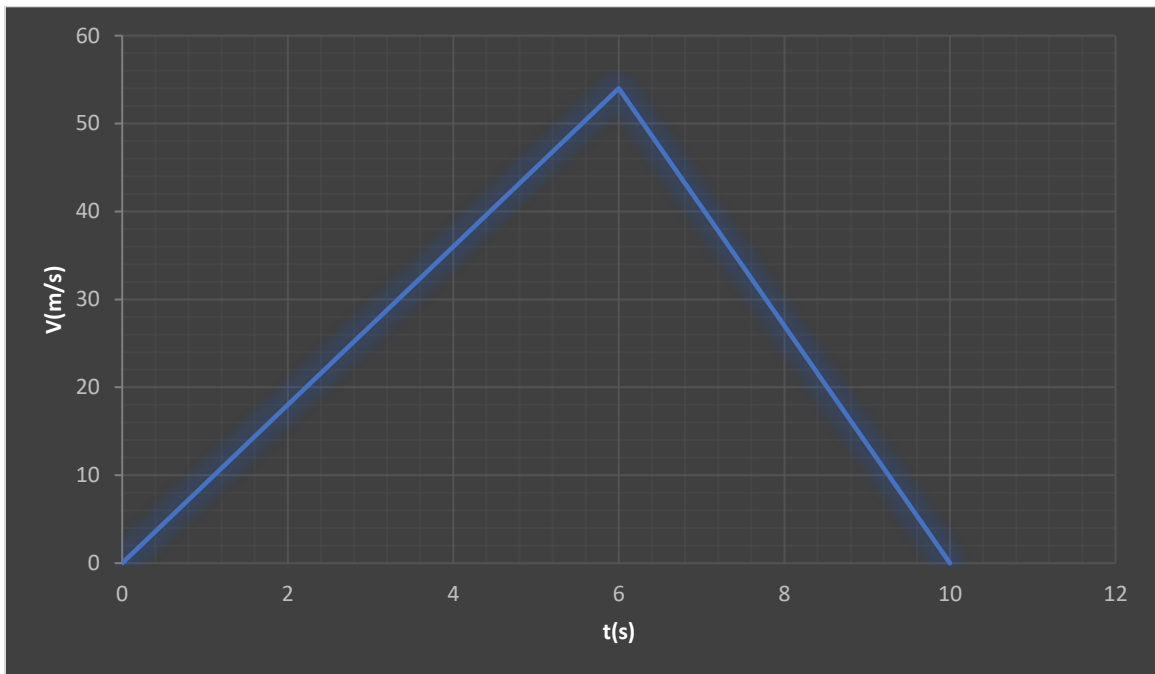
$$V = 1.5 \cdot (0^2) = 0$$

$$V = 1.5 \cdot (6^2) \\ = 54m/s$$

At $6s < t < 10$

$$S = 108m$$

$$V = 0m/s$$



2. Find a-t and S-t graph

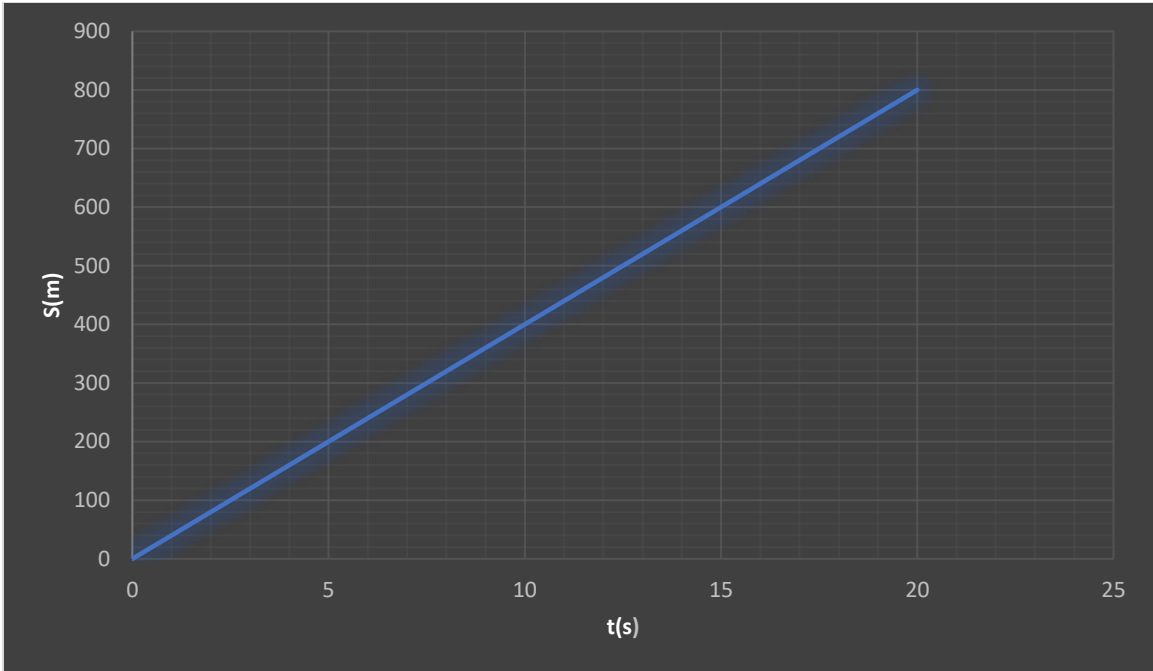
$$V = -4 \cdot t + 80$$

$$S = \int_{20}^0 (-4 \cdot t + 80) \cdot dt$$

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

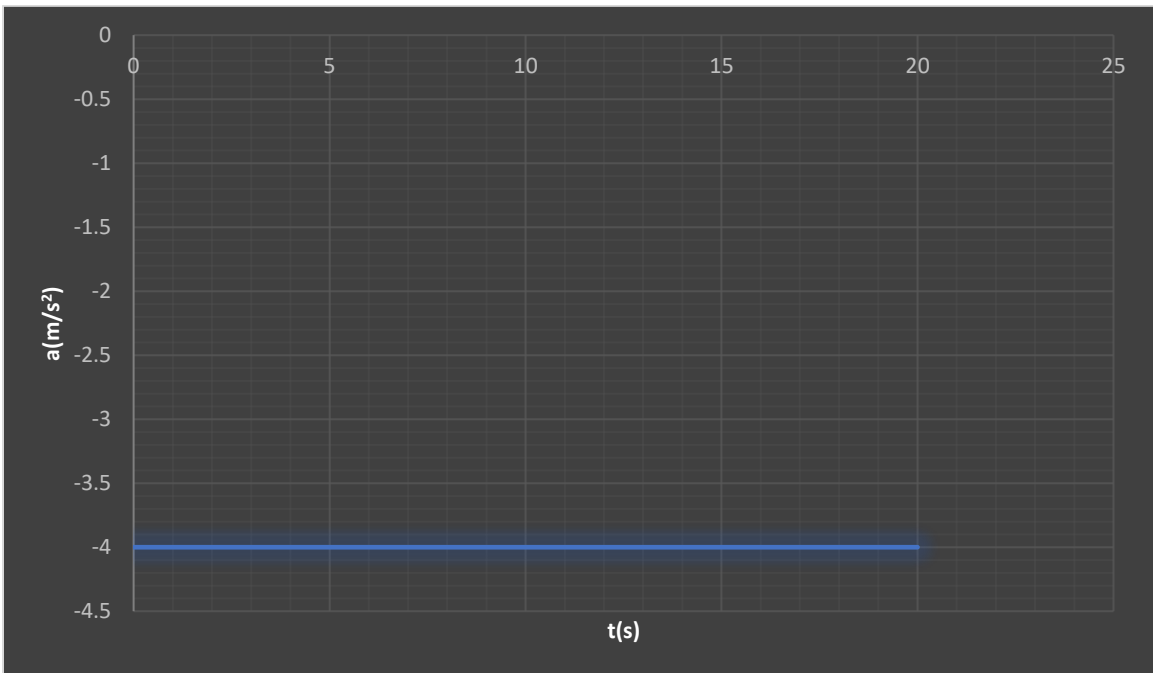
At $0s < t < 20s$

$$S = 0m \text{ \& } 800m$$



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

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



3. Draw graph of a-s

$$V = 0.25 \cdot S$$

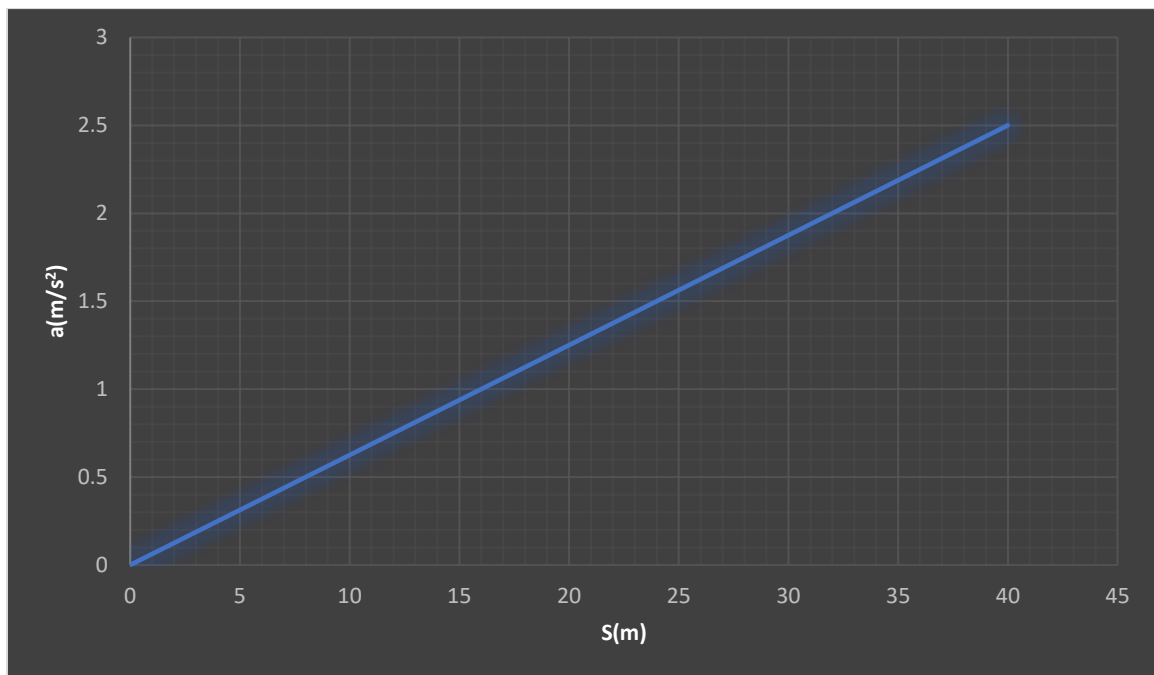
$$a = V \cdot \frac{dV}{dS}$$

$$a = (0.25 \cdot S) \cdot 0.25$$

$$a = 0.0625 \cdot S$$

At $0s < t < 40s$

$$a = 0 \text{ m/s}^2 \text{ \& } 2.5 \text{ m/s}^2$$



4. Find a-t and v-t graph

At $0s < t < 5s$

$$S = 3 \cdot t^2$$

$$V = \frac{dS}{dt}$$

$$V = 6 \cdot t \text{ m/s}$$

$$a = \frac{d^2S}{dt^2}$$

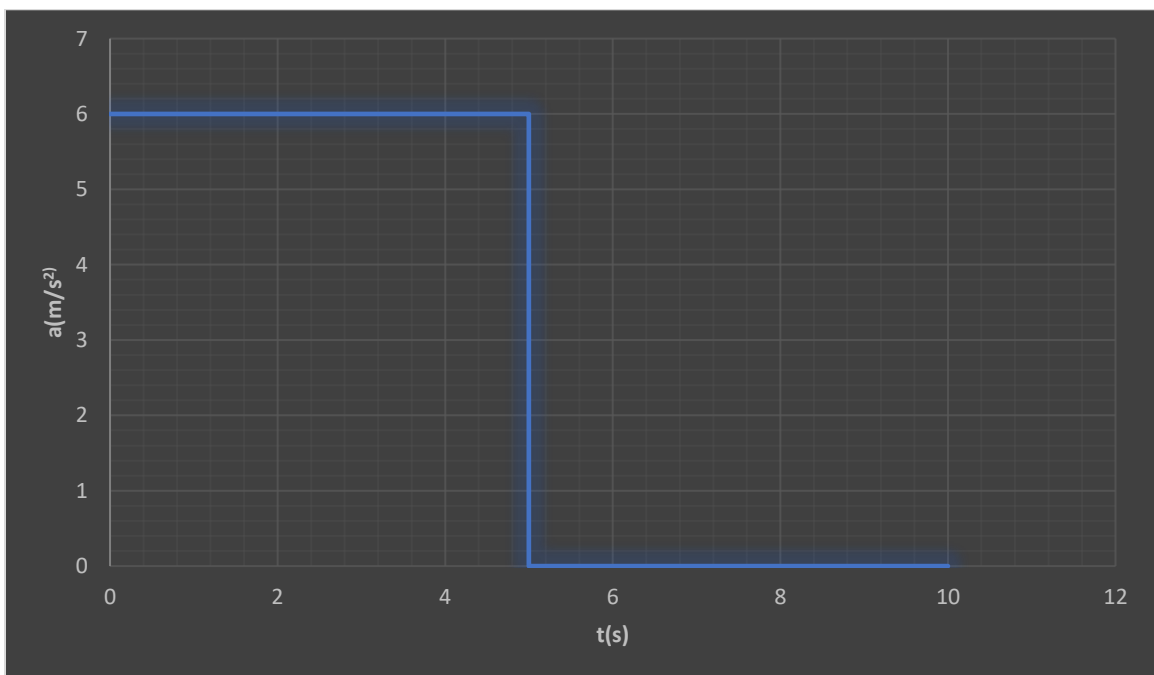
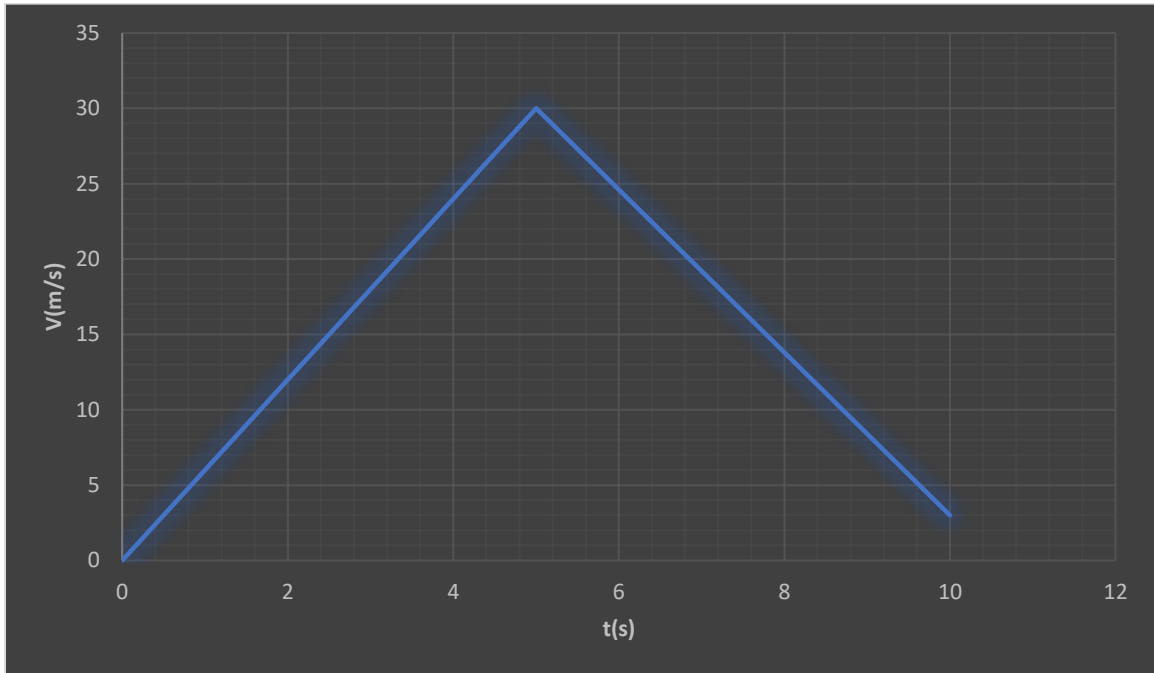
$$a = 6 \text{ m/s}^2$$

At $5s < t < 10s$

$$S = 30t - 75$$

$$V = \frac{dS}{dt}$$
$$V = 30\text{m/s}$$

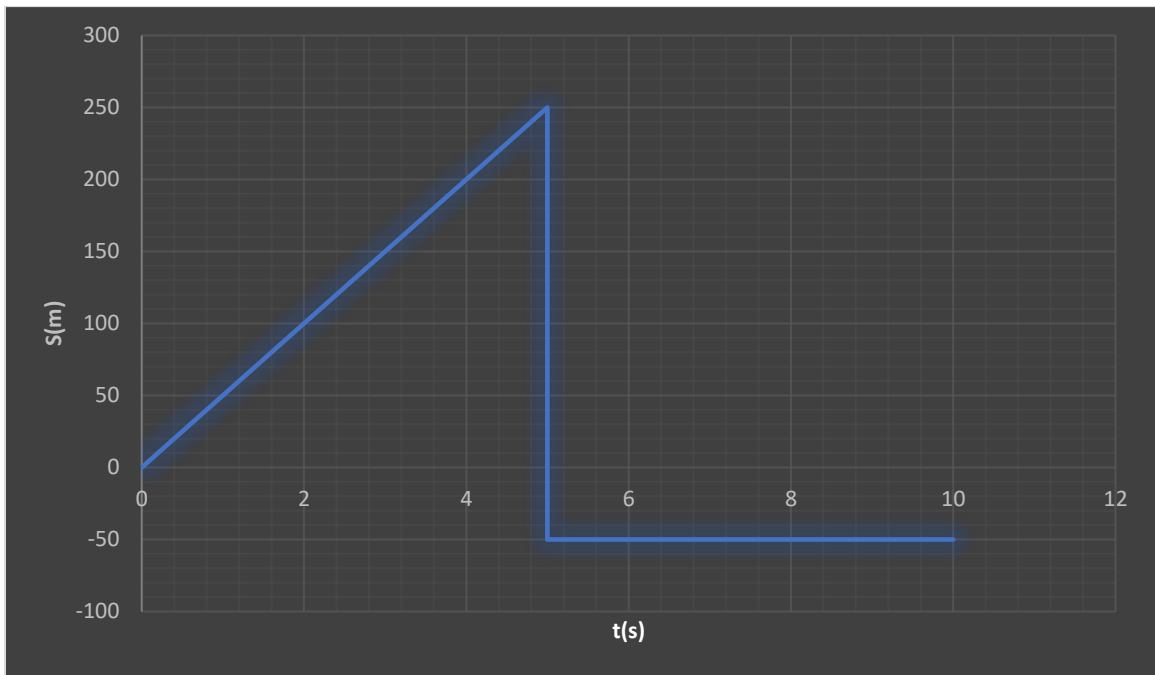
$$a = 0\text{ m/s}^2$$



5. Given $0s < t < 5s$

$$S = 10*t^2 \text{ \& } -10*t$$

$$S = 250\text{m \& } -50\text{m}$$



6. Given $V = 30*t$ and $V = -15*t + 225$, Draw S-t graph

$$S = \int(-15 * t + 225)$$

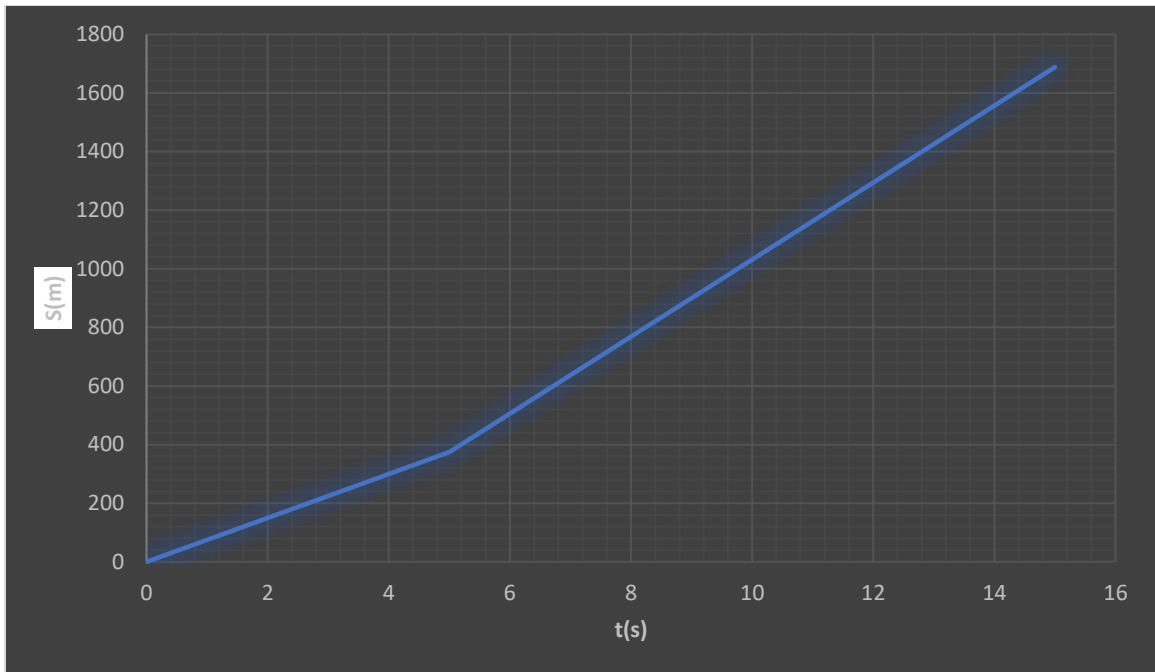
$$S = \frac{15*t^2}{2} + 225*t$$

$$S = \int(30 * t)$$

$$S = 15*t^2$$

At $0s < t < 15s$

$S = 0\text{m, } 375\text{m \& } 1688\text{m}$



Total distance is the total area under the line .

At $0s < t < 5s$

$$\text{Area} = \frac{5 \cdot 385}{2} = 962.5$$

At $5s < t < 15s$

$$\text{Area} = \left(\frac{10 \cdot 1313}{2} \right) + (385 \cdot 10) = 10415$$

Total Area/distance covered = 11107.5