

Deriving the SUVAT equations

There are 5 equations we can use to model constant acceleration known as the SUVAT equations. They are:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

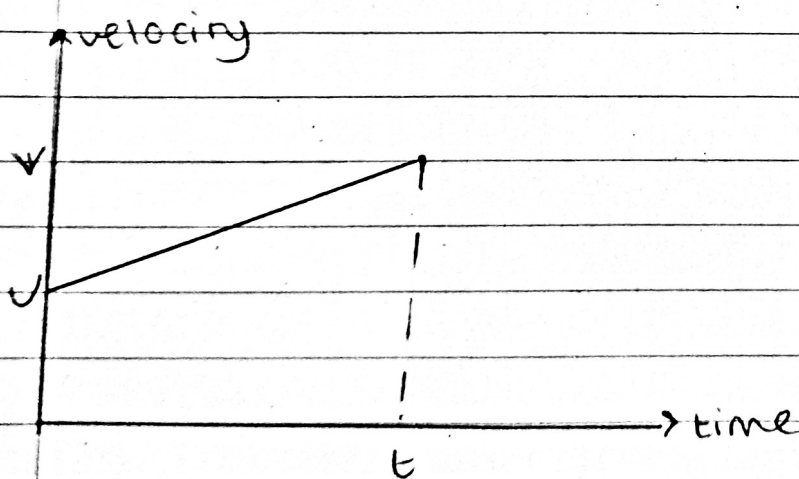
$$v^2 = u^2 + 2as$$

$$s = vt - \frac{1}{2}at^2$$

$$s = \frac{1}{2}(u+v)t$$

where s is displacement, u is initial velocity, v is final velocity, a is acceleration and t is time.

You can derive these from a velocity-time graph:



Can you derive all the formulae?

Hints

- Acceleration is change in velocity over time
- Think about what the area under a graph represents