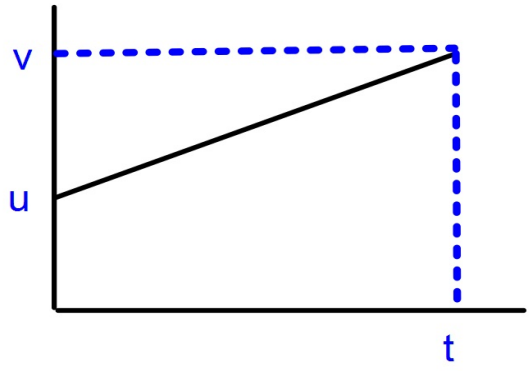
Derive the Kinematic Equations:



v = s / t

a = (v - u) / t

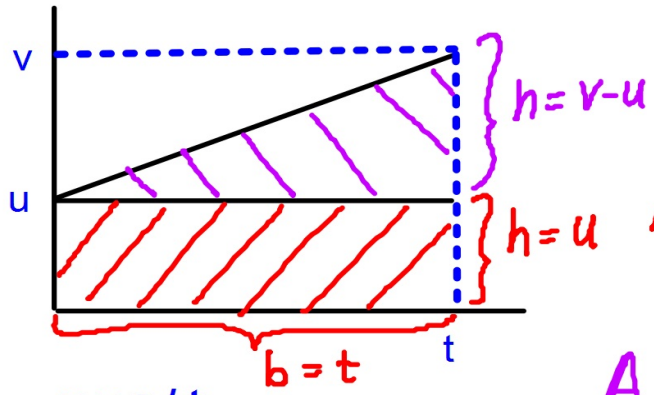
Part 1:
Solve for displacement (s) in terms of initial velocity (u), final velocity (v) and time (t)

Part 2:
Solve for displacement (s) in terms of initial velocity (u), acceleration (a) and time (t)

Part 3:
Solve for final velocity (v) in terms of initial velocity (u), acceleration (a) and time (t)

Part 4:
Solve for final velocity squared (v^2) in terms of initial velocity squared (u^2), acceleration (a) and displacement (s)

Derive the Kinematic Equations:



v = s / t

a = (v - u) / t

Part 1:
Solve for displacement (s) in terms of initial velocity (u), final velocity (v) and time (t)

$A_{\square} = b \cdot h$

$s_{\square} = (t)(u) = ut$

$A_{\Delta} = \frac{1}{2}\, b \cdot h$

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

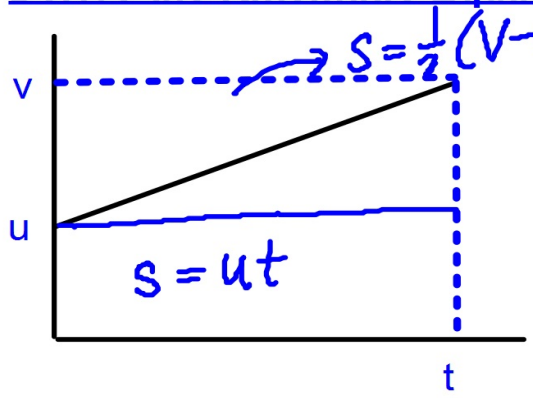
$s_{\Delta} = \frac{1}{2}vt - \frac{1}{2}ut$

$s = ut + \frac{1}{2}vt - \frac{1}{2}ut$

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

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

Derive the Kinematic Equations:



$v = s / t$

$a = (v - u) / t$

$t * a = \frac{(v-u)}{t} * t$

$at = v - u$

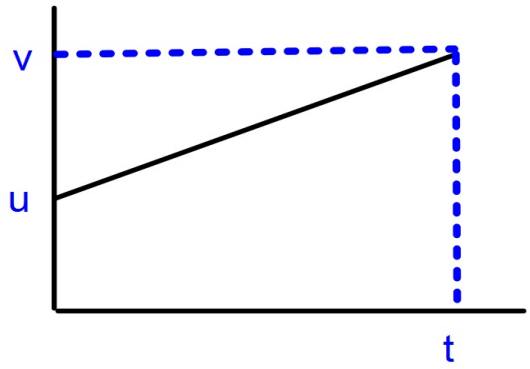
Part 2:
Solve for displacement (s) in terms of initial velocity (u), acceleration (a) and time (t)

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

$s = ut + \frac{1}{2}(at)t$

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

Derive the Kinematic Equations:



$v = s / t$

$a = (v - u) / t$

Part 3:
Solve for final velocity (v) in terms of initial velocity (u), acceleration (a) and time (t)

$t * a = \frac{(v-u)}{t} * t$

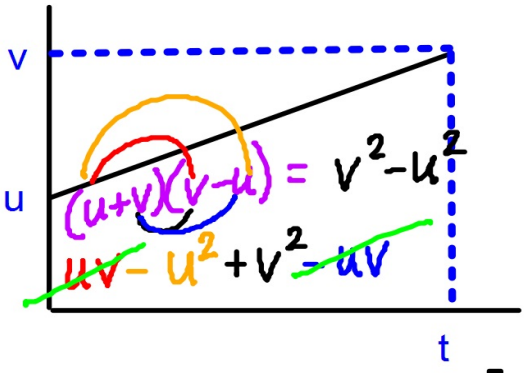
$at = v - u$

$+u \quad +u$

$u + at = v$

$v = u + at$

Derive the Kinematic Equations:



v = s / t

a = (v - u) / t

$v = u + at$

$-u \quad -u$

$\frac{v-u}{a} = \frac{at}{a}$

Part 4: $v^2 = u^2 + 2as$

Solve for final velocity squared (v^2) in terms of initial velocity squared (u^2), acceleration (a) and displacement (s)

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

$v = u + at$ $\quad t = \frac{v-u}{a}$

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

$s = \frac{(u+v)}{2}\left(\frac{v-u}{a}\right)$

$s = \frac{(u+v)(v-u)}{2a}$ * Distribute (FOIL)

$2as = v^2 - u^2$

$+u^2 \quad +u^2$

$2a * s = \frac{v^2-u^2}{2a} * 2a$