– MOTION OF A PARTICLE

$$\mathbf{r} = \mathbf{r}_0 + \mathbf{v}t$$

$\mathbf{r}_0$ = intial position
$\mathbf{v}$ = velocity
t = time
$\mathbf{r}$ = current position

– VECTOR NOTATION

$$3\mathbf{i} + 5\mathbf{j}$$

or

$$\begin{pmatrix} 3 \\ 5 \end{pmatrix}$$

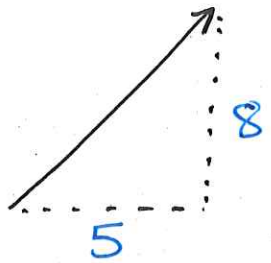
– SUVAT AND VECTORS

$$\mathbf{r} = \mathbf{u}t + \tfrac{1}{2}\mathbf{a}t^2$$

$$\mathbf{v} = \mathbf{u} + \mathbf{a}t$$

– PROJECTILES

Velocity = $5\mathbf{i} + 8\mathbf{j}$



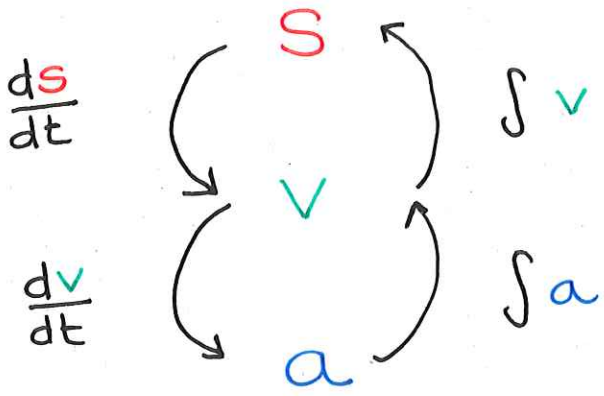
vertical speed = 8

horizontal speed = 5

Speed = magnitude

$= \sqrt{5^2 + 8^2} = \sqrt{89}$

- VARIABLE ACCELERATION



- DIFFERENTIATING VECTORS

$$S = 3ti + 4t^2 j$$

$$V = 3i + 8tj$$

- INTEGRATING VECTORS

$$a = t^2 i + (5+3t)j$$

$$V = \left(\frac{t^3}{3} + C_i\right) + \left(5t + \frac{3t^2}{2} + C_j\right)j$$

Both i and j components will have a C value