

MIND MAP			
Kinematics 1D			
			Slope $y = (m)x + c$ Slope (m) = $\tan \theta$ $0 < \theta < 90^\circ$ slope = +ve $90^\circ < \theta < 180^\circ$ slope = -ve $\theta = 0^\circ$ slope = 0
			For particle under constant acceleration (1) $v = u + at$ (2) $s = ut + \frac{1}{2}at^2$ (3) $v^2 = u^2 + 2as$ (4) $V_{avg} = \frac{u+v}{2}$ (5) $s = V_{avg} t = \left(\frac{u+v}{2}\right)t$
			Motion under gravity 1) $T_{time \text{ of flight}} = \frac{2u}{g}$ 2) $H_{max} = \frac{u^2}{2g}$ 3) $t_1 = t_2 = \sqrt{\frac{2H}{g}} = \frac{u}{g}$
			Relative motion $\vec{r}_{2/1} = \vec{r}_2 - \vec{r}_1$ $\vec{v}_{2/1} = \vec{v}_2 - \vec{v}_1$ $\vec{a}_{2/1} = \vec{a}_2 - \vec{a}_1$ Position of 2 w.r.t. 1 ($\vec{r}_{2/1}$)
			Local maxima and Local minima $\frac{dy}{dx}$ 0 Local maxima 0 Local minima $\frac{d^2y}{dx^2}$ -ve +ve
			Integration i.e. Area Differentiation i.e. Slope Integration i.e. Area If sign of a and v are same then speed is increasing and if sign are opposite then speed is decreasing
			Speed Average $\langle \text{Speed} \rangle = \frac{s}{\Delta t}$ Instantaneous $\text{Inst. Speed} = \frac{ds}{dt}$ Velocity Average $\langle \vec{v} \rangle = \frac{\Delta \vec{r}}{\Delta t}$ Instantaneous $\vec{v}_{inst} = \frac{d\vec{r}}{dt}$ Acceleration Average $\langle \vec{a} \rangle = \frac{\Delta \vec{v}}{\Delta t}$ Instantaneous $\vec{a} = \frac{d\vec{v}}{dt}$ $\Delta \vec{r}$ is displacement (minimum distance between initial and final point) s is distance
			Integration $\int x^n dx = \frac{x^{n+1}}{n+1} + c$ $\int \frac{1}{x} dx = \ln x + c$ $\int e^x dx = e^x + c$ $\int \sin x dx = -\cos x + c$ $\int \cos x dx = \sin x + c$ $\int (f(x) + g(x)) dx = \int f(x) dx + \int g(x) dx$ $\int kf(x) dx = k \int f(x) dx$
			differentiation $\frac{d}{dx} x^n = nx^{n-1}$ $\frac{d}{dx} \ln x = \frac{1}{x}$ $\frac{d}{dx} e^x = e^x$ $\frac{d}{dx} \cos x = -\sin x$ $\frac{d}{dx} \tan x = \sec^2 x$ $\frac{d}{dx} \cot x = -\text{cosec}^2 x$ $\frac{d}{dx} \frac{y_1}{y_2} = \frac{y_2 \frac{dy_1}{dx} - y_1 \frac{dy_2}{dx}}{y_2^2}$