

$$\frac{\cancel{\theta} \sin \theta}{\cancel{\theta} \cos \theta}$$

$$\sin \theta (y - a(\sin \theta - \theta \cos \theta)) = -\cos \theta (x - a(\cos \theta + \theta \sin \theta))$$

$$y \sin \theta + x \cos \theta = a$$



$$V = \frac{4}{3} \pi (r^3 - 10^3)$$

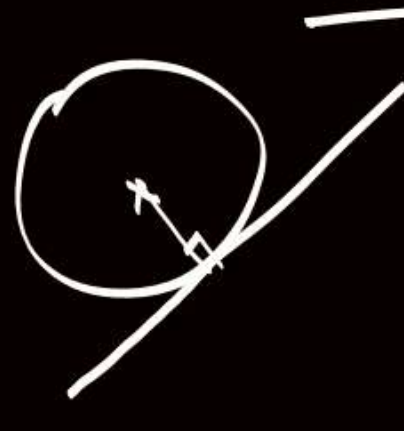
$$r - 10 = 5$$

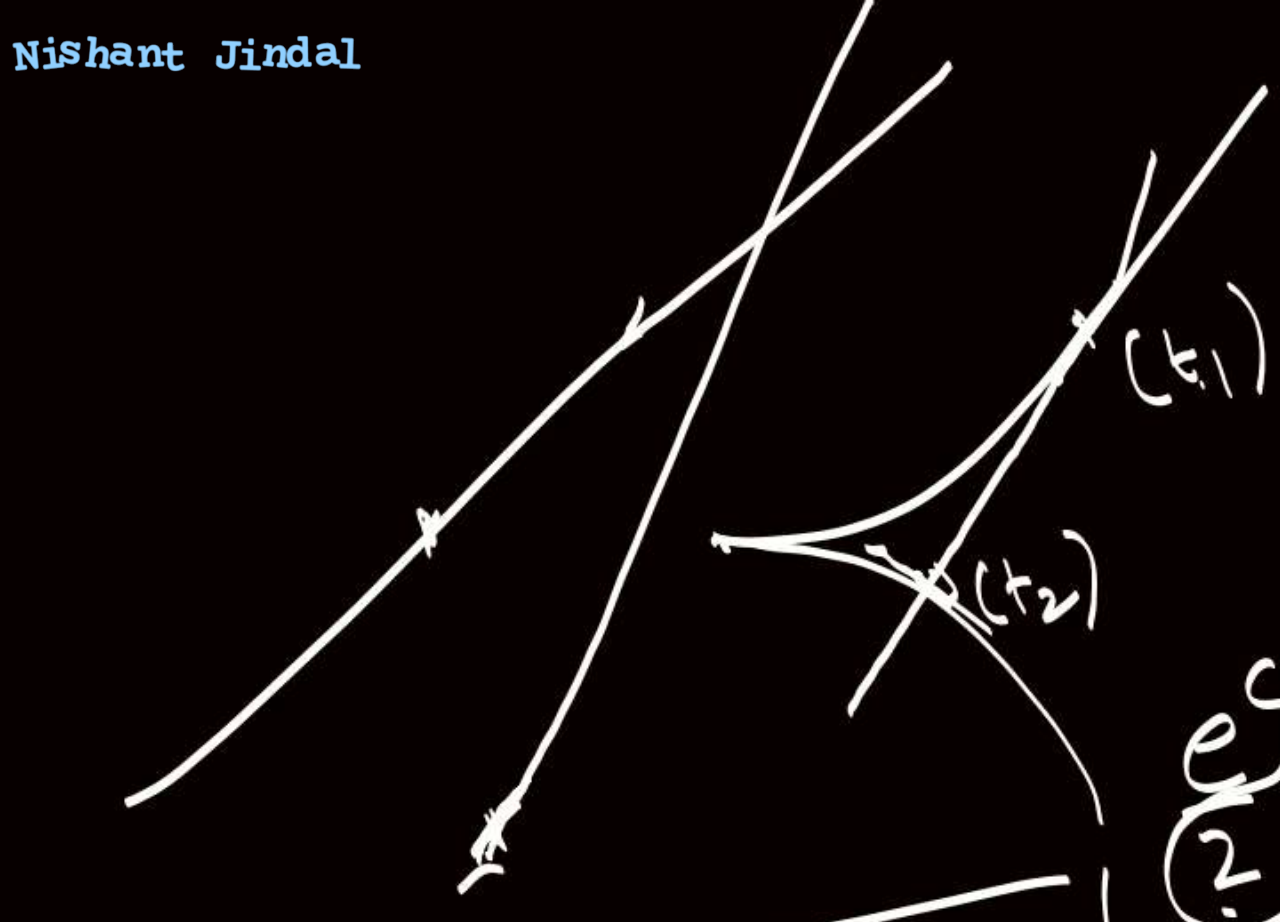
$$r = 15$$

$$x = \frac{y+7}{2} - 6 = \frac{y-5}{2}$$

$$2x = y - 5$$

$$\frac{|-16+6+5|}{\sqrt{5}} = \sqrt{100-C}$$


$$C = ?$$

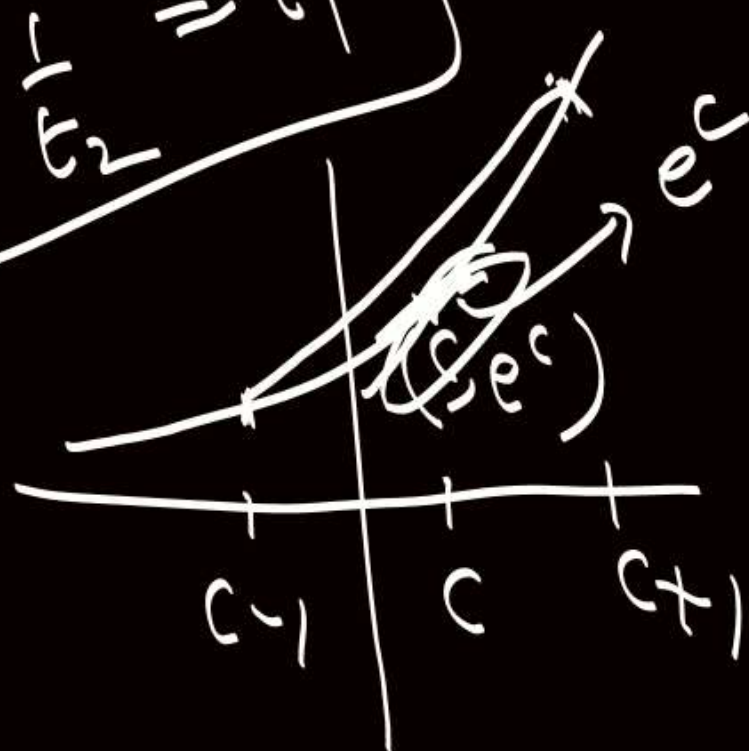
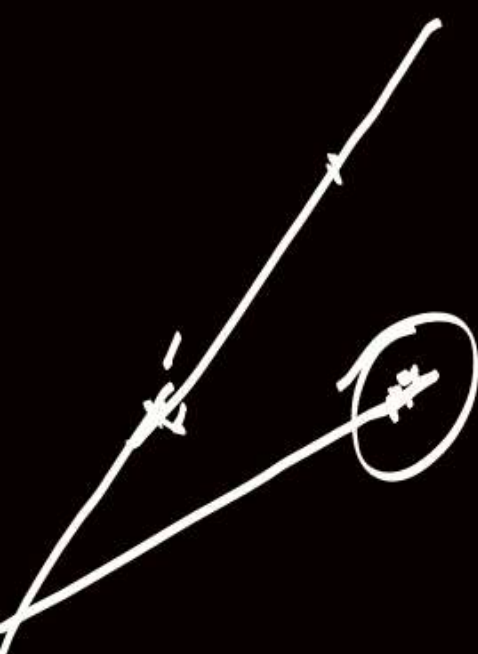


$$\frac{2(t_1^3 - t_2^3)}{3(t_1^2 - t_2^2)} = \boxed{t_1} = \frac{2(t_1^2 + t_2^2 + t_1 t_2)}{3(t_1 + t_2)}$$

$$e^c \left(\frac{e - \frac{1}{e}}{2} \right) > \boxed{e^c}$$

$$t_1^2 - 2t_2 + t_1 t_2 = 0$$

$$\boxed{-\frac{1}{t_2} = t_1}$$



$$e^c (t_1 - t_2)(t_1 + 2t_2) = 0$$

$$\boxed{t_1 = -2t_2}$$

$$t_1 = \frac{2}{t_1}$$

$$\boxed{t_1 = \pm \sqrt{2}}$$

$$\frac{\sin \theta}{1 + \cos \theta} = \tan \frac{\theta}{2}$$
$$\frac{d}{dt} m = \frac{1}{2} \sec^2 \frac{\theta}{2} \left[\frac{d\theta}{dt} \right]$$

Fundamental Theorem of Calculus

Let $f(x)$ be continuous in $[a, b]$, $F'(x) = f(x)$,

then
$$\int_a^b f(x) dx = F(b) - F(a)$$

$\int_a^b f(x) dx$
 $b \rightarrow$ upper limit
 $a \rightarrow$ lower limit

$$y = f(x)$$

$$\Delta A = f(x) \Delta x$$

$$\Delta A = f(x + \Delta x) \Delta x$$



$$\Delta A = \left(\frac{f(x) + f(x + \Delta x)}{2} \right) \Delta x$$

$$f(x) \Delta x$$

$$\lim_{\Delta x \rightarrow 0} \frac{\Delta A}{\Delta x}$$

$$= \boxed{f(x) = \frac{dA}{dx}}$$

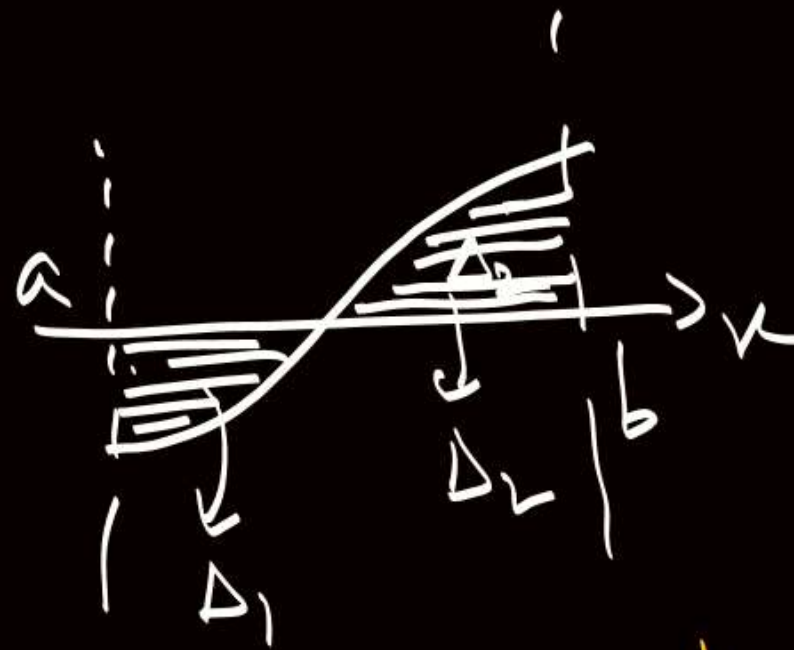
$$\frac{\Delta A}{\Delta x} = f(x)$$

$$dA = f(x) dx$$

$$\int_a^b dA = \int_a^b f(x) dx$$

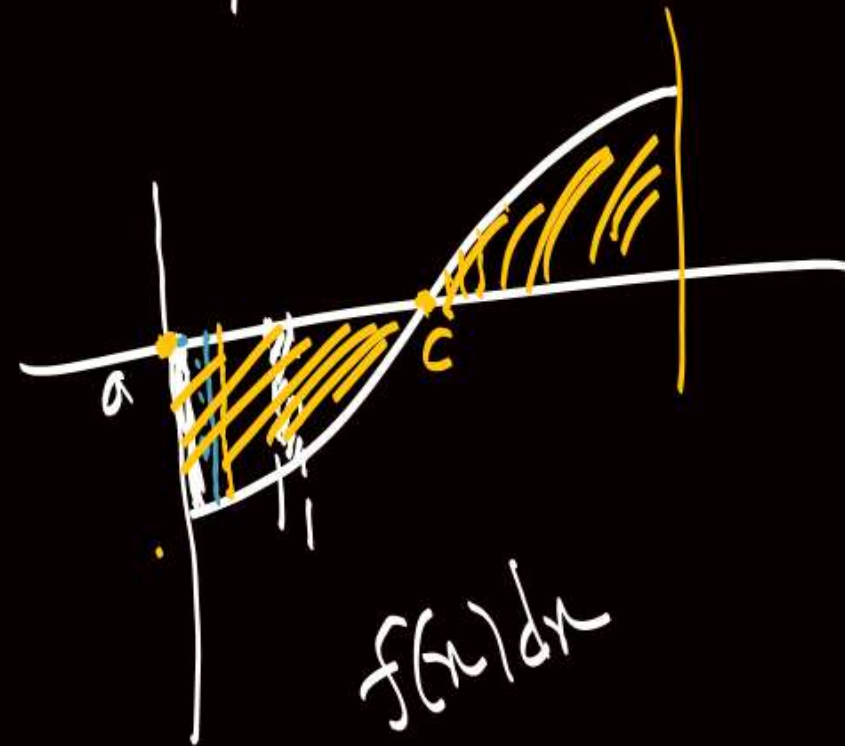
$$= f(x + \Delta x)$$

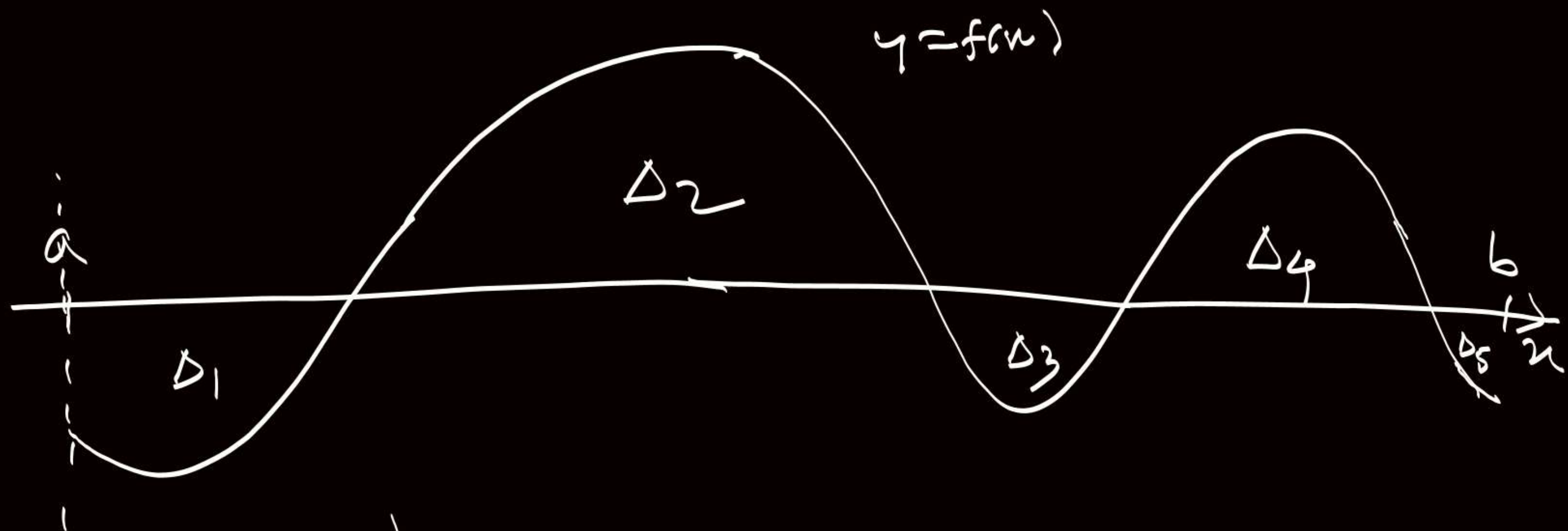
$$= \frac{f(x) + f(x + \Delta x)}{2}$$



$$\int_a^b f(x) dx = -\Delta_1 + \Delta_2$$

$\int_a^b f(x) dx$ means





$$a < b$$

$$\int_a^b f(x) dx = -\Delta_1 + \Delta_2 - \Delta_3 + \Delta_4 - \Delta_5$$

Area bounded by $f(x)$ with x -axis
between $x=a$ & $x=b = \Delta_1 + \Delta_2 + \Delta_3 + \Delta_4 + \Delta_5$

Definite Integral as limit of Sum

$$f(a)h + f(a+h)h + f(a+2h)h + \dots + f(a+(n-1)h)h \approx \int_a^b f(x)dx$$

$$b = a + nh$$



$$\lim_{n \rightarrow \infty} \sum_{r=1}^n f(a+(r-1)h)h = \int_a^b f(x)dx$$

$$\lim_{n \rightarrow \infty} \sum_{r=1}^n \left(\frac{b-a}{n} \right) f\left(a+(r-1)\left(\frac{b-a}{n}\right)\right) = \int_a^b f(x)dx$$

$$\int_a^b f(x) dx = F(b) - F(a)$$

$$F'(x) = f(x) \rightarrow \text{cont.}$$

$$F(x)$$

$$c_1 \in (a, a+h)$$

$$h F'(c_1) = F(a+h) - F(a)$$

$$c_2 \in (a+h, a+2h)$$

$$h F'(c_2) = F(a+2h) - F(a+h)$$

$$c_3 \in (a+2h, a+3h)$$

$$h F'(c_3) = F(a+3h) - F(a+2h)$$

$$= F(b) - F(a)$$

$$c_n \in (a+(n-1)h, a+nh)$$

$$h F'(c_n) = F(a+nh) - F(a+(n-1)h)$$

$$\sum_{i=1}^n h f(c_i) = F(b) - F(a)$$

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n h f(c_i)$$

$$= \int_a^b f(x) dx$$

Monotonicity

$\Sigma x - \text{IV} \rightarrow 99.5+$
 $\Sigma x - \text{III} \rightarrow$