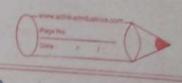
## Formula sheet Indefinite Integration.



· Basic integration formula:-

1. 
$$\int x^n dx = \frac{x^{n+1}}{n+1} + c, n \neq 1$$

2. 
$$\int \frac{1}{x} dx = |og|x| + c, x \neq 0$$

$$4. \int 0^{\chi} d\chi = \frac{q^{\chi}}{\log_e a} + c$$

8. 
$$\int \cos e^2 x dx = -\cot x + c$$

11. 
$$\int \frac{dx}{J1-x^2} = \sin^{-1}x + \cos^{-1}x + \cos^$$

12. 
$$\int \frac{dx}{1+x^2} = \tan x + c \quad \text{or} \quad -\cot x + c$$
13. 
$$\int \frac{dx}{x \sqrt{x^2-1}} = \sec^{-1}x + c \quad \text{or} \quad \csc^{-1}x + c$$

14. 
$$\int 1 dx = x + C$$
15. 
$$\int F(x) dx = F(ax+b) + C$$
4(ax+b) a

· Important Results:-

2] 
$$\int J + \sin 2x = -\cos x + \sin x + c$$
  
3]  $\int J \times dx = \frac{2}{3} \times x^{3/2} + c$ 

$$4\int \int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + C$$

$$5) \int \frac{F'(x)}{F(x)} dx = \log(F(x)) + C$$

8] 
$$\int \sec x \cdot dx = \log |\sec x + \tan x| + c$$
  
 $= \log \left[ \tan \left( \frac{\pi}{4} - \frac{\pi}{2} \right) \right] + c$   
9]  $\int \csc x dx = \log |\csc x - \cot x| + c$   
 $= \log |\tan \left( \frac{\pi}{2} \right) + c$   
10]  $\int (f(x))^n \cdot f'(x) \cdot dx = [f(x)]^{n+1} + c$ ,  $n$   
 $= \log |\sin x| + c$ 

· Integrals of form:

$$Ny = A(Dy) + B d (Dy)$$

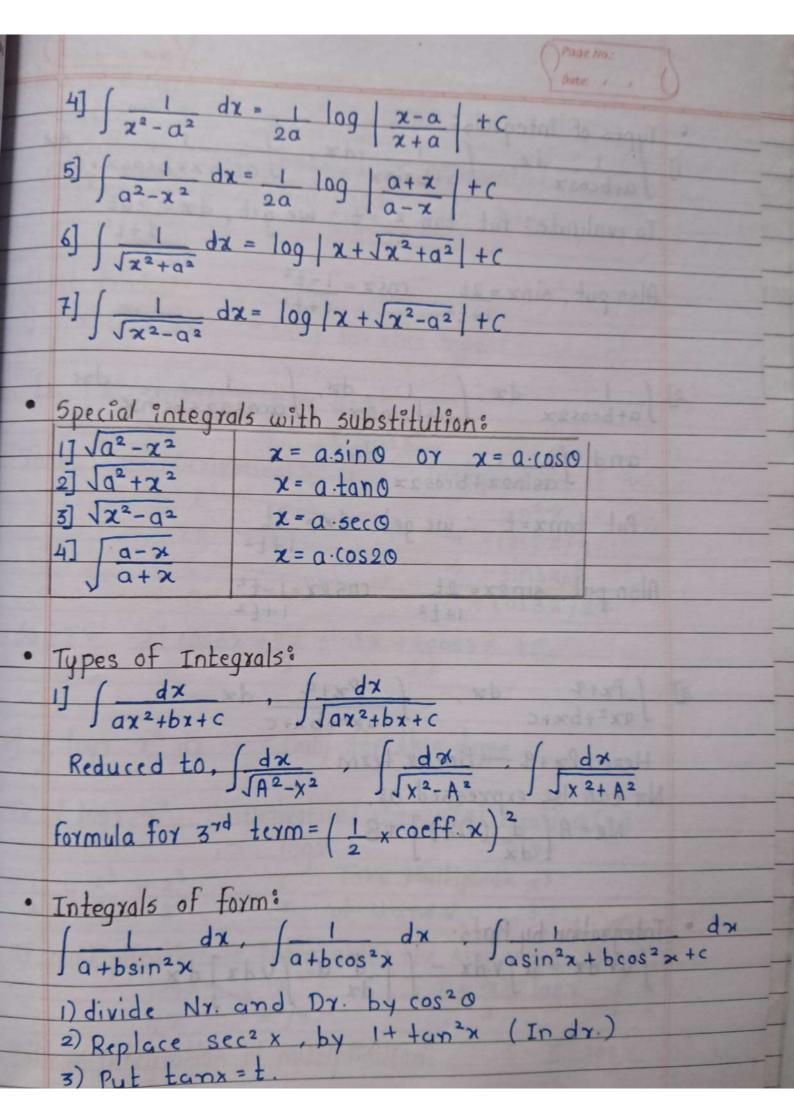
Denominator of function.

• Some special integrals:-

1) 
$$\int \frac{1}{x^2 + a^2} dx = \int \frac{1}{a} \tan^{-1} \left(\frac{x}{a}\right) + C$$

$$2\int \int \frac{1}{\sqrt{\alpha^2 - x^2}} dx = \sin^{-1}\left(\frac{x}{\alpha}\right) + C$$

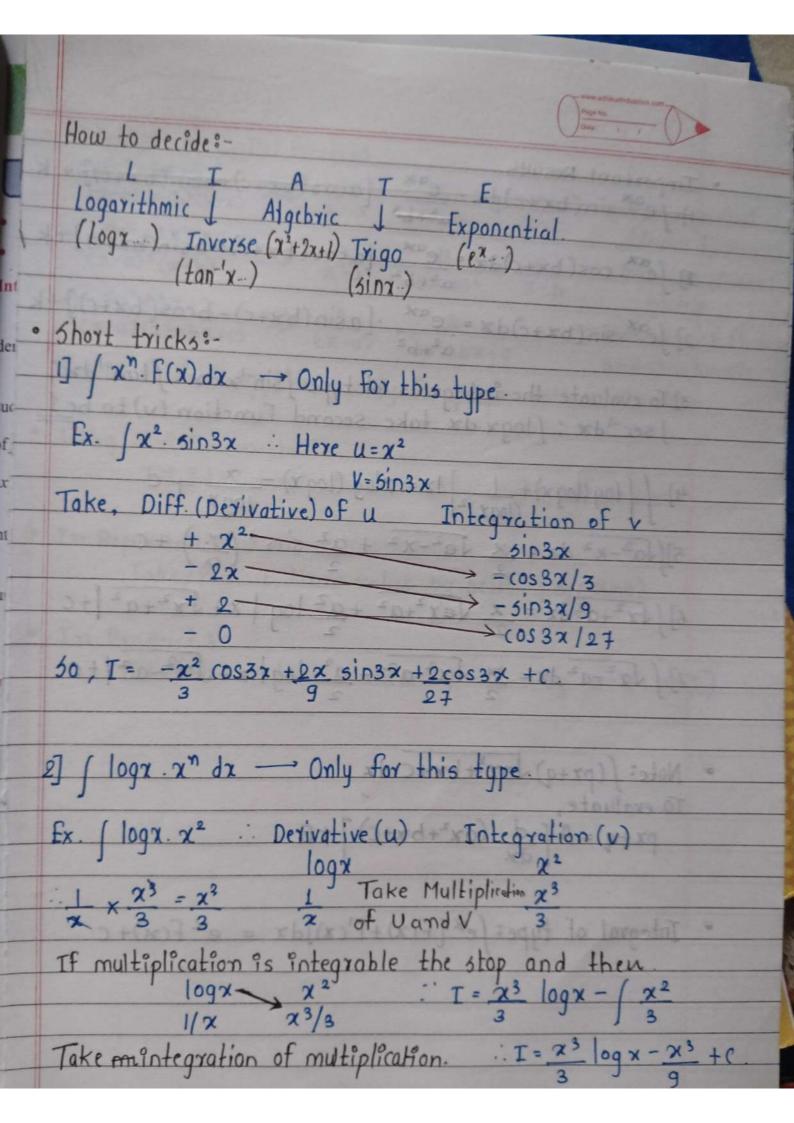
$$\int \frac{1}{x \sqrt{x^2 - a^2}} dx = \int \frac{1}{a} \sec^{-1} \left(\frac{x}{a}\right) + C$$



· Types of integrals: 1) for integrals.

1) for dx, for dx, for dx, for dx for d To evaluate: Put tan x = t we get, dx = 2dt

1+t2 Also put,  $\sin x = 2t$   $\cos x = 1 - t^2$   $1 + t^2$   $1 + t^2$ 2 Ja+bcos2x dx Ja+bsin2x Jacos2x+bsin2x and fasinex + bcosex : Put tonx=t : we get, dx = dt Also put,  $\sin 2x = 2t$   $\cos 2x = 1 - t^2$  $\frac{3}{\int Px+9} dx, \int \frac{Px+9}{\int qx^2+bx+c} dx$ Here, Px+9 - Linear term No can be expressed as. NIT = A [ d (DIT)] +B Integration by Ports.
 | uv dx = u | v·dx - | | d u | | vdx | dx



• Important Results.

1) 
$$\int e^{ax} \sin(bx+c)dx = e^{ax} \cdot \left[a\cos(bx+c) + b\sin(bx+c)\right] + k$$

2)  $\int e^{ax} \cdot \cos(bx+c)dx = e^{ax} \cdot \left[a\cos(bx+c) + b\sin(bx+c)\right] + k$ 

2) 
$$\int e^{ax} \cdot \cos(bx+c)dx = e^{ax} \cdot [a\cos(bx+c)+b\sin(bx+c)]+k$$

2) 
$$\int e^{ax} \cdot \sin(bx+c)dx = e^{ax} \cdot \left[a\sin(bx+c) - b\cos(bx+c)\right] + k$$

4] 
$$\int \left[ \log(\log x) + 1 \right] dx = \chi \log(\log x) - \chi + c$$
  
 $\int \left[ (\log x)^2 \right] dx = \chi \log(\log x) - \chi + c$ 

$$5) \int \sqrt{a^2 - x^2} \, dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1}\left(\frac{x}{a}\right) + c$$

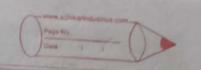
6] 
$$\int \sqrt{x^2 + a^2} dx = \frac{x}{2} \sqrt{ax^2 + a^2} + \frac{a^2}{2} \log |x + \sqrt{x^2 + a^2}| + c$$

$$7 \int \sqrt{x^2 - a^2} \, dx = \frac{x}{2} \sqrt{x^2 - a^2} - \frac{a^2}{2} \log |x + \sqrt{x^2 - a^2}| + C$$

Note: (px+q) Jax2+bx+cdx To evaluate,

$$px+q = A \left[ \frac{d}{dx} \left( ax^2 + bx + c \right) \right] + B$$

· Integral of type: 
$$\int e^{x} [F(x) + F'(x)] dx = e^{x} F(x) + c$$



Integration by partial fractions

· Long division method:

Dividend = (Divisior x Quotient) + Remainder.

· In Repeated Linears

Take/Put 1 time value by self. (eg: x=0)

· In Product:

Take/Put 2 time value by self. (eg: x=0, x=1)