13/09/xx Class- XII Sc (MATHS) K. Kanhaiya

Topic :- Integration :-

(1) $\int \frac{dx}{\sqrt{1+4x^2}}$

$= \int \frac{dx}{\sqrt{4\left(\frac{1}{4}+x^2\right)}}$

$= \frac{1}{2}\int \frac{dx}{\sqrt{(1/2)^2+x^2}}$

$= \frac{1}{2}\sinh^{-1}\frac{1}{2}\log\left|x+\sqrt{x^2+\frac{1}{4}}\right| + C$

(2) $\int \frac{x^2 dx}{1-x^6}$

$\int \frac{x^2}{1-(x^3)^2}dx$ let $x^3 = t$

$\frac{dt}{dx} = 3x^2 \Rightarrow \frac{dt}{3} = x^2 dx$

$\frac{1}{3}\int \frac{dt}{1-t^2}$

$\frac{1}{3}\times\frac{1}{2}\log\left|\frac{1+t}{1-t}\right| = \frac{1}{6}\log\left|\frac{1+x^3}{1-x^3}\right| + C$

(3) $\int \frac{dx}{x^2-6x+13}$

$\int \frac{dx}{(x)^2-2\cdot 3x+3^2-3^2+13}$

$\int \frac{dx}{(x-3)^2+2^2}$

Let $x-3=t \quad \therefore \frac{dt}{dx}=1 \Rightarrow dt=dx$

$\int \frac{dt}{t^2+2^2}$

$\frac{1}{2}\tan^{-1}\frac{t}{2}+c$

$= \frac{1}{2}\tan^{-1}\frac{x-3}{2}+c.$