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19/MHS01/198
MBBS
Assignment

1 $\int \frac{2x}{\sqrt{4x^2-1}} dx$

2 $\int \frac{\sin^{-1}x}{\sqrt{1-x^2}} dx$

3 $\int (\tan x)^6 \sec^2 x dx$

Soln

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

let $u = 4x^2 - 1$

$\frac{du}{dx} = 8x$

$dx = \frac{du}{8x}$

$\int \frac{\cancel{2x}}{\sqrt{u}} \cdot \frac{du}{\cancel{8x}_4}$

$= \int u^{-1/2} \frac{du}{4}$

$= \frac{1}{4} \int u^{-1/2} . du$

$\Rightarrow \frac{1}{4} \frac{u^{1/2}}{1/2} + C = \frac{1}{\cancel{4}_2} u^{1/2} \cancel{2} + C$

$\therefore \int \frac{2x}{\sqrt{4x^2-1}} dx = \frac{1}{2} u^{1/2} + c = \frac{1}{2} \sqrt{(4x^2-1)} + c$

where C = constants of equation

2 $\int \frac{\sin^{-1}x}{\sqrt{1-x^2}} dx$

$\int \sin^{-1}x \cdot (1-x^2)^{-1/2} dx$

let $u = \sin^{-1}x$

$\frac{du}{dx} = (1-x^2)^{-1/2}$

$\therefore dx = \frac{du}{(1-x^2)^{-1/2}}$

$\int u \cdot \cancel{(1-x^2)^{-1/2}} \cdot \frac{du}{\cancel{(1-x^2)^{-1/2}}}$

$\int u \cdot du$

$= \frac{u^2}{2} + c$

$\therefore \int \frac{\sin^{-1}x \, dx}{\sqrt{1-x^2}} = \frac{(\sin^{-1}x)^2}{2} + c$ where c = constant of equation

3 $\int (\tan x)^6 \sec^2 x dx$

let $u = \tan x$

$\frac{du}{dx} = \sec^2 x$

$dx = \frac{du}{\sec^2 x}$

$\int u^6 \cancel{\sec^2 x} \cdot \frac{du}{\cancel{\sec^2 x}}$

$\int u^6 du$

$= u^7 + c$

$$\int (\tan x)^6 \sec^2 x \, dx = \frac{(\tan x)^7}{7} + c$$

where c = constant of an equation