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19/MHS01/097
MBBS
Maths 104

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

let $u = \sqrt{4x^2-1} = (4x^2-1)^{1/2}$, $du/dx = \frac{1}{\cancel{2}}(4x^2-1)^{-1/2} \cdot \cancel{8}^{4}x = 4x(4x^2-1)^{-1/2}$

$dx = \frac{du}{4x(4x^2-1)^{-1/2}} = \frac{(4x^2-1)^{1/2}}{4x}\,du$

We have

$2\int \frac{x}{u}\,dx = \cancel{2}\int \frac{\cancel{x}}{\cancel{(4x^2-1)^{1/2}}} \cdot \frac{\cancel{(4x^2-1)^{1/2}}}{\cancel{4}_{2}\cancel{x}}\,du = \frac{1}{2}\int du = \frac{1}{2}u + C$

$= \frac{1}{2}\sqrt{4x^2-1} + C$

2] $\int \frac{\sin^{-1}x}{\sqrt{1-x^2}}\,dx = \int \sin^{-1}x \cdot (1-x^2)^{-1/2}\,dx$

let $u = \sin^{-1}x$, $du/dx = (1-x^2)^{-1/2}$, $du = (1-x^2)^{-1/2}\,dx$

$\int u\,du = \frac{u^2}{2} + C = \frac{(\sin^{-1}x)^2}{2} + C$

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

let $u = \tan x$, $du = \sec^2 x\,dx$

We have

$\int u^6\,du = \frac{u^7}{7} + C = \frac{(\tan x)^7}{7} + C$