Emenfu Faith Olorgeli
19/MHS01/152
MBBS
Math 102

① $\int \frac{2x}{\sqrt{4x^2-1}}\,dx$

Let $u = \sqrt{4x^2-1}$

$= (4x^2-1)^{1/2}$

$du/dx = 1/2(4x^2-1)^{-1/2} \cdot 8x$

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

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

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

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

$= 1/2 \int du$

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

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

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

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

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

$\int u\,du = u^2/2 + c$

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

$\frac{(\sin^{-1}x)^2}{2} + c$

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

Let $u = \tan x$

$du = \sec^2 x \, dx$

$\int u^6 \, du = \frac{u^7}{7} + C$

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