AJISE TENIOLA PRECIOUS
19/MHS01/069
MBBS

ASSIGNMENT

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

let $u = 4x^2 - 1$

$u + 1 = 4x^2$

$x = \left(\frac{u+1}{4}\right)^{1/2} = \frac{(u+1)^{1/2}}{2}$

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

$\int \frac{\cancel{2}(u+1)^{1/2}}{\cancel{2}} \div u^{1/2} \cdot \frac{du}{4(u+1)^{1/2}}$

$\int \cancel{(u+1)^{1/2}} \times \frac{1}{u^{1/2}} \cdot \frac{du}{4\cancel{(u+1)^{1/2}}}$

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

$\frac{1}{4}\left[\frac{u^{-1/2+1}}{-1/2+1}\right] + c$

$\frac{1}{4} \times 2u^{1/2} + c$

$\frac{1}{2} u^{1/2} + c$

but $u = 4x^2 - 1$

Ans: $\frac{1}{2}\sqrt{4x^2-1} + c$

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

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

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

$\frac{du}{dx} = \frac{1}{\sqrt{1-x^2}}$

$dx = du \sqrt{1-x^2}$

$\int \frac{u}{\cancel{\sqrt{1-x^2}}} \cdot du \cancel{\sqrt{1-x^2}}$

$\int u \, du$

$\frac{u^{1+1}}{1+1} + c$

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

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

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

$$\frac{u^{1+1}}{1+1} + c$$

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

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

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

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

③ $\int (\tan x)^6 \sec^2 x\,dx$

let $u = \tan x$

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

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

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

$\int u^6\,du$

$\cancel{\int u^6 du}$ $\frac{u^{6+1}}{6+1} + c$

$$\frac{u^7}{7} + c$$

but $u = \tan x$

$$\frac{(\tan x)^7}{7} + c$$

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

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