

Ogunyebi Oluwadamilola - E

191MHS 01/300

MBBS: Maths 104 Assignment

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

Let: $u = \sqrt{4x^2-1} = (4x^2-1)^{1/2}$

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

$dx \cdot 2$

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

dx

$dx = \frac{du}{4x}$

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

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

$4x$

\Rightarrow We have:

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

$= \frac{1}{2} \int du$

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

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

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

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

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

$\int u du = \frac{u^2}{2} + C$

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

2

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

let $u = \tan x$

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

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

\Rightarrow But $u = \tan x$

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

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