

AGBAJOR AGHOGHO

19/MH501/051

MBBS [Medicine & Surgery]

MAT104 ASSIGNMENT

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

let  $u = 4x^2 - 1$

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

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

$$\int \frac{2x}{\sqrt{u}} \times \frac{du}{8x}$$

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

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

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

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

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

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

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

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

let  $u = \tan x$

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

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

$$\int u^6 du$$

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

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

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

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

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

Recall:  $\int \frac{1}{\sqrt{a^2-x^2}} dx = \sin^{-1} \frac{x}{a} + C$

$$\therefore \sin^{-1} x \times \sin^{-1} \frac{x}{1} + C$$

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