

Name: PAPIKA DIJA YUSUFU

Matric Number: 19/MHS01/381

Department: MBBS (Medicine and Surgery)

MAT 104-Assignment

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

$$\text{let } u = 4x^2 - 1$$

$$\frac{du}{dx} = \frac{8x}{1}$$

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

$$\Rightarrow \int \frac{2x}{u^{1/2}} dx = \int 2x \cdot \frac{du}{8x} \cdot u^{-1/2}$$

$$\int \frac{2x}{8x} \cdot du \cdot u^{-1/2}$$

$$\Rightarrow \frac{1}{4} \int du \cdot u^{-1/2} = \frac{1}{4} \times \frac{u^{-1/2+1}}{-1/2+1} + C$$

$$\Rightarrow \int \frac{2x}{\sqrt{4x^2-1}} dx = \frac{1}{4} \times \frac{u^{1/2}}{1/2} + C$$

$$\Rightarrow \int \frac{2x}{\sqrt{4x^2-1}} dx = \frac{1}{2} \times u^{1/2} + C$$

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

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

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

$$\Rightarrow \text{let } u = \sin^{-1} x$$

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

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

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

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

$$\text{let } u = \tan x$$

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

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

$$\therefore \int (\tan x)^6 \sec^2 x dx = \int u^6 du$$

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

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