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Department: MBBS

### Assignment

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

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

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

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

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

we have

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

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

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

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

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

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

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

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

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

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

let  $u = \tan x$

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

we have

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

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