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DEPARTMENT : MBBS
COURSE : MAT 104

ASSIGNMENT

① $\int \frac{2x}{\sqrt{4x^2-1}}\,dx$

Solution

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

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

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

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

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

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

$dx = du \cdot \frac{[4x^2-1]^{1/2}}{4x}$

$$dx = \frac{[4x^2-1]^{1/2}\,du}{4x}$$

$$= \int \frac{2x}{u} \cdot \frac{[4x^2-1]^{1/2}\,du}{4x}$$

$$= \int \frac{1}{[4x^2-1]^{1/2}} \cdot \frac{[4x^2-1]^{1/2}}{2}\,du$$

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

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

$$= \frac{1}{2}u + C$$

$$= \frac{1}{2}[4x^2-1]^{1/2} + C$$

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

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

solution

$\int \sin^{-1} x \cdot [1-x^2]^{-1/2}\, dx$

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

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

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

$= \frac{[\sin^{-1} x]^2}{2} + C$

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

solution

let $u = \tan x$

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

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

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