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19/MHS01/061

CHEM 1
ASSIGNMENT

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

let $U = 4x^2 - 1$

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

$\therefore dx = du/8x$

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

$\int \frac{2x}{8x} \cdot dU \cdot U^{-1/2}$

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

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

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

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

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

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

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

let $u = \tan x$

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

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

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

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

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

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