OLIH, ANITA IMABONG | 19/mhs01/335

MAT 104

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

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

3) $\int \tan x)^6 \sec^2 x\,dx \Rightarrow \begin{cases} u=\tan x \\ du=\sec^2 x\,dx \\ u^6 du = u^7/7 \end{cases}$

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

Solution.

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

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

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

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

we have

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

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

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

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

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

let $u = \tan x$

we have

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

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