

Discrete Arithmetic Exercise

19/11/2023

MAS 35

MATHS 104

① $\int \frac{2x}{\sqrt{4x^2-1}} dx$

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

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

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

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

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

$\int \frac{2x}{u} dx$

$2 \int \frac{x}{u} dx$

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

$\frac{2}{4} \int du$

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

② $\int \frac{\sin^{-1} x}{1-x^2} dx$

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

let $u = \sin^{-1} x$ and $du = (1-x^2)^{-1/2} dx$

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

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

③ $\int (\tan x)^6 \sec^2 x dx$
let $\tan x = u$ and $\sec^2 x dx = du$

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

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