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Level: 100

Matric number: 19/MTT/Soil/281

Course: Mat 104

Assignment

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

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

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

$$dx \neq$$

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

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

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

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

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

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

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

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

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

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

$$3) \int (\tan x)^7 \sec^2 x dx$$

$$\text{let } u = \tan x$$

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

we have

$$\int u^7 du = \frac{u^8}{8} + C$$

$$= \frac{(\tan x)^8}{8} + C$$