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Dept: MBBS / MHIS

Sn: 19 / MH501 / 157

Assignment

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

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

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

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

$$\therefore \int \frac{2x}{\sqrt{4x^2-1}} \times \frac{du}{4x(4x^2-1)^{-1/2}} = \frac{1}{2} \int du$$

$$f(x) = \frac{1}{2}u + C$$

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

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

$$\int \sin^{-1}x \cdot (1-x^2)^{-1/2} dx ; \text{ let } u = \sin^{-1}x$$
$$du = (1-x^2)^{-1/2} dx$$

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

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

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

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

$$\therefore f(x) = \int u^6 \, du$$

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

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