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Matric No: 19/MHS01/247

1)

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

$$U = \{4x^2-1\}^{1/2}$$

$$U^2 = 4x^2-1 \quad \therefore U^2+1 = 4x^2$$

$$x = \left\{\frac{U^2+1}{4}\right\}^{1/2}$$

$$\frac{dx}{du} = \frac{1}{2}\left\{\frac{U^2+1}{4}\right\}^{-\frac{1}{2}} \cdot \frac{U}{2}$$

$$dx = \frac{U\,du}{4}\left\{\frac{U^2+1}{4}\right\}^{-\frac{1}{2}}$$

$$2\int \left\{\frac{U^2+1}{4}\right\}^{1/2} = \frac{1}{U} \cdot \frac{U\,du}{4}\left\{\frac{U^2+1}{4}\right\}^{-\frac{1}{2}}$$

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

$$\frac{2}{4}\int du = \frac{1}{2}[U] + C$$

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

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

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

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 $u = \tan x$

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

we have

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

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

Class