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MATRIC NO: 19/MHS01/384
DEPARTMENT: MBBS

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

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

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

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

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

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

$$\int \frac{2x}{u}\,du$$

$$2\int \frac{x}{u}\,du$$

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

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

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 $u = \tan x$

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

we have

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

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