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MATRIC NO: 19/MHS01/120.

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

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

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

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

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

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

$= \frac{1}{2}\int du$.

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

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

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

Let $u = \sin^{-1}x$.

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

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

$\int \tan^6 x \sec^2 x \, dx$

let $u = \tan x$.

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

we have.

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

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