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

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

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

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

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

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

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

We have

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

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

$= 1/2\,u + C = 1/2\sqrt{4x^3-1} + C$

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

Where $u = \sin^{-1}$

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

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

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

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

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

Where $u = \tan x$

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

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

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