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Medical And Health Sciences. Medicine & Surgery

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

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

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

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

dx

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

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

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

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

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

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