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$\frac{u^7 + C}{7}$

But $u = \tan x$

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

$\int (\tan x)^6 \sec^2 x \, dx = \frac{(\tan x)^7}{7} + C$

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

let $u = \sin^{-1}x$

$\frac{du}{dx} = \frac{1}{\sqrt{1-x^2}}$

$dx = du\sqrt{1-x^2}$

$\int \frac{u}{\sqrt{1-x^2}} \cdot du\sqrt{1-x^2}$

$\int u\,du$

$\frac{u^{1+1}}{1+1} + c$

$\frac{u^2}{2} + c$

But $u = \sin^{-1}x$

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

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

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

~~let~~

let $u = \tan x$

$\frac{du}{dx} = \sec^2 x$

$dx = \frac{du}{\sec^2 x}$

$\int u^6 \cdot \sec^2 x \cdot \frac{du}{\sec^2 x}$

$\int u^6\,du$

$\frac{u^{6+1}}{6+1} + c$

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

let $u = 4x^2 - 1$

$u + 1 = 4x^2$

$x = \left(\frac{u+1}{4}\right)^{1/2} = \left(\frac{u+1}{2}\right)^{1/2}$

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

$\int \frac{2(u+1)^{-1/2}}{2} \div \frac{u^{1/2}}{1} \cdot \frac{du}{4(u+1)^{1/2}}$

$\int (u+1)^{1/2} \times \frac{1}{u^{1/2}} \cdot \frac{du}{4(u+1)^{1/2}}$

$\frac{1}{4}\int u^{-1/2} du$

$\frac{1}{4}\left[\frac{u^{-1/2+1}}{-1/2+1}\right] + C$

$\frac{1}{4} \times 2u^{1/2} + C$

$\frac{1}{4}$

$\frac{1}{2} u^{1/2} + C$

2

but $u = 4x^2 - 1$

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

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