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

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

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

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

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

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

Solution

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

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

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

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

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

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

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

Solution

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ASSIGNMENT

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

Solution

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

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

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

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

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

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

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

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

$\int \frac{2x}{\sqrt{4x^2-1}}\,dx = \int \frac{2x}{u} \cdot \frac{(4x^2-1)^{1/2}\,du}{4x_2}$

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

Let $u = \tan x$

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

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

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

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