

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

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

$$u^2 = 4x^2-1$$

$$2^2 = \frac{u^2-1}{4}$$

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

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

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

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

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

le faire

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

$$\int \frac{u du}{2} \times \frac{1}{u}$$

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

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

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

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

$$= \int \begin{array}{l} u = \sin^{-1}x \\ \frac{du}{dx} = \frac{1}{\sqrt{1-x^2}} \\ du = \frac{1}{\sqrt{1-x^2}} dx \end{array}$$

we have

$$\int u du$$

$$= \frac{u^2}{2} + C$$

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

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

$$u = \tan x$$

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

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

we have

$$\int u^6 du$$

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

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