

~~Let $u = \tan x \rightarrow du = \sec^2 x dx$~~

$$\int \tan^2 x \sec^4 x dx = \int u^2 (1+u^2) du = \int (u^2 + u^4) du = \frac{u^3}{3} + \frac{u^5}{5} + C$$

$$\int \tan^2 x \sec^4 x dx = \frac{1}{3} \tan^3 x + \frac{1}{5} \tan^5 x + C$$

$$\begin{aligned} \textcircled{2} \int \sec^6 x dx &= \int \sec^4 x \sec^2 x dx = \int (\sec^2 x)^2 \sec^2 x dx \\ &= \int (1 + \tan^2 x)^2 \sec^2 x dx \end{aligned}$$

~~Let $u = \tan x \rightarrow du = \sec^2 x dx \rightarrow \int \sec^6 x dx = \int (1+u^2)^2 du$~~

~~$$\int \sec^6 x dx = \int (1 + 2u^2 + u^4) du = u + \frac{2}{3} u^3 + \frac{1}{5} u^5 + C$$~~

~~$$\int \sec^6 x dx = \tan x + \frac{2}{3} \tan^3 x + \frac{1}{5} \tan^5 x + C$$~~

$$\textcircled{3} \int \sec^2 x dx = \tan x + C$$

③ لو $m=0$ و n عدد فردي موجب فأنا أستعمل الطريقة الأولى
 $\tan^2 x = \sec^2 x - 1$

Examples: Find

$$\textcircled{1} \int \tan^2 x dx = \int (\sec^2 x - 1) dx = \int \sec^2 x dx - \int dx = \tan x - x + C$$

$$\begin{aligned} \textcircled{2} \int \tan^4 x dx &= \int \tan^2 x \tan^2 x dx = \int \tan^2 x (\sec^2 x - 1) dx \\ &= \int \tan^2 x \sec^2 x dx - \int \tan^2 x dx \end{aligned}$$

$$\int \tan^4 x dx = \frac{\tan^3 x}{3} - \int (\sec^2 x - 1) dx = \frac{1}{3} \tan^3 x - \tan x + x + C$$

④ لو m عدد فردي موجب و $n=0$ فأنا أستعمل الطريقة الثانية في اولى

Examples:

$$\textcircled{1} \int \sec x dx = \int \sec x \cdot \frac{\sec x + \tan x}{\sec x + \tan x} dx = \int \frac{\sec^2 x + \sec x \tan x}{\sec x + \tan x} dx$$