

$$\circ \int \sec x dx = \ln|\sec x + \tan x| + C$$

$$\textcircled{2} \int \sec^3 x dx = \int \underbrace{\sec x}_u \underbrace{\sec^2 x dx}_{dv} = \int u dv$$

$$= uv - \int v du$$

$$= \sec x \tan x - \int \tan x \sec x \tan x dx$$

$$= \sec x \tan x - \int \tan^2 x \sec x dx$$

$$\int \sec^3 x dx = \sec x \tan x - \int (\sec^2 x - 1) \sec x dx$$

$$= \sec x \tan x - \int \sec^3 x dx + \int \sec x dx$$

$$2 \int \sec^3 x dx = \sec x \tan x + \ln|\sec x + \tan x|$$

$$\therefore \int \sec^3 x dx = \frac{1}{2} \sec x \tan x + \frac{1}{2} \ln|\sec x + \tan x| + C$$

⑤ لو انا م عدي و م عدي فانا نسايم ابنا بالبقية

$$\tan^2 x = \sec^2 x - 1$$

Example

$$\textcircled{1} \int \tan^2 x \sec x dx \quad \textcircled{2} \int \tan^2 x \sec^3 x dx$$

$$\text{Soln} \quad \textcircled{1} \int \tan^2 x \sec x dx = \int (\sec^2 x - 1) \sec x dx$$

$$= \int \sec^3 x dx - \int \sec x dx$$

$$u = \sec x \quad dv = \sec^2 x dx$$

$$du = \sec x \tan x dx \quad v = \tan x$$

$$\therefore \int \tan^2 x \sec x dx = \underbrace{\sec x \tan x}_{uv} - \int \underbrace{\tan x \sec x}_{v du} dx - \int \sec x dx$$