15)

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

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

$u^2 = 4x^2 - 1 \quad \therefore \quad u^2+1 = 4x^2$

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

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

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

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

$$\frac{2}{4}\int \frac{u}{u}\,du$$

$$\frac{2}{4}\int du = \frac{1}{2}[u] + C$$

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

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

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

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

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

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

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

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

Let $u = \tan x$

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

we have

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

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