$$= \tan^{-1}(3x)\cdot x - \int x \cdot \frac{3\,dx}{1+9x^2}$$

$$= x\tan^{-1}(3x) - \int \frac{3x\,dx}{1+9x^2}$$

$$= x\tan^{-1}(3x) - \frac{1}{6}\int \frac{18x\,dx}{1+9x^2}$$

$$\therefore \int \tan^{-1}(3x)\,dx = x\tan^{-1}(3x) - \frac{1}{6}\ln|1+9x^2| + c$$

6) a) $\int e^x \cos x\,dx$ b) $\int \sin(\ln x)\,dx$ ch. c) $\int \cos(\ln x)\,dx$ ch.

a) $\int e^x \cos x\,dx \longrightarrow u = e^x \qquad dv = \cos x\,dx$

$du = e^x\,dx \qquad v = \sin x$

$$\therefore \int e^x \cos x\,dx = \int u\,dv = uv - \int v\,du$$

$$\therefore \int e^x \cos x\,dx = e^x \sin x - \int \sin x \cdot e^x\,dx \quad \text{------ ①}$$

الآن نجد $\int \sin x \cdot e^x\,dx$ نستخدم ايضاً طريقة التجزئة

$\int e^x \sin x\,dx \longrightarrow u = e^x \qquad dv = \sin x\,dx$

$du = e^x\,dx \qquad v = -\cos x$

$$\therefore \int e^x \sin x\,dx = \int u\,dv = uv - \int v\,du$$

$$= e^x(-\cos x) - \int -\cos x \cdot e^x\,dx$$

$$\therefore \int e^x \sin x\,dx = -e^x \cos x + \int \cos x \cdot e^x\,dx$$

بالتعويض في ① ينتج أن:

$$\therefore \int e^x \cos x\,dx = e^x \sin x - \left[-e^x \cos x + \int \cos x \cdot e^x\,dx\right]$$

$$\therefore \int e^x \cos x\,dx = e^x \sin x + e^x \cos x - \int e^x \cos x\,dx$$