Section 28.4: cont'd

Wednesday, February 06, 2013
10:30 AM

⑥ $\int \frac{\tan e^{-x}}{e^{x}}\, dx$

$= \int e^{-x} \tan e^{-x}\, dx$

let $u = e^{-x}$
$du = -e^{-x}dx$

$= -\int \tan u\, du$

$= +\ln|\cos u| + C$

$= \ln|\cos e^{-x}| + C$

⑦ $\int \frac{\tan 2x}{\cos 2x}\, dx$

method #1:

$= \int \frac{\sin 2x}{\cos^2 2x}\, dx$

let $u = \cos 2x$
$du = -2\sin 2x\, dx$

$= \int -\frac{1}{2}\frac{du}{u^2}$

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

$= \frac{1}{2\cos 2x} + C$ } either

$$= \frac{1}{2}\sec 2x + C$$

method #2:

$$\int \frac{\tan 2x}{\cos 2x}\,dx = \int \tan 2x \sec 2x \,dx$$

$$= \frac{1}{2}\sec 2x + C$$

(8) $\int \frac{1}{1+\sin\theta}\,d\theta$ hint: multiply by $\left(\frac{1-\sin\theta}{1-\sin\theta}\right)$

$$= \int \frac{1}{1+\sin\theta}\left(\frac{1-\sin\theta}{1-\sin\theta}\right)d\theta$$

$$= \int \frac{1-\sin\theta}{1-\sin^2\theta}\,d\theta$$

$$= \int \frac{1-\sin\theta}{\cos^2\theta}\,d\theta$$

$$= \int \left(\frac{1}{\cos^2\theta} - \frac{\sin\theta}{\cos^2\theta}\right)d\theta$$

$$= \int \left(\sec^2\theta - \frac{\sin\theta}{\cos^2\theta}\right)d\theta$$

$$= \tan\theta - \frac{1}{\cos\theta} + C$$

$= \tan\theta - \frac{1}{\cos\theta} + C$

$= \tan\theta - \sec\theta + C$

$= \frac{\sin\theta - 1}{\cos\theta} + C$

} any of these

(9) $\int \sin x \cos x \, dx$

method #1: let $u = \sin x$, $du = \cos x \, dx$

$= \int u \, du$

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

$= \frac{\sin^2 x}{2} + C$

method #2 let $u = \cos x$, $du = -\sin x \, dx$

$= -\int u \, du$

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

$= -\frac{\cos^2 x}{2} + C$

method #3:

$\int \sin x \cos x \, dx = \int \frac{1}{2} \sin 2x \, dx$

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