Section 28.4: cont'd

Monday, January 15, 2018 10:26 AM

⑧ $\int \frac{\tan e^{-x}}{e^x}\, dx$

let $u = e^{-x}$

$du = -e^{-x}\, dx$

$-du = e^{-x}\, dx$

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

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

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

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

⑨ $\int \frac{\tan 2x}{\cos 2x}\, dx$

let $u = \sec 2x$

$du = 2\tan 2x \sec 2x$

method #1: $= \int \tan 2x \sec 2x\, dx$

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

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

let $u = \cos 2x$

$du = -2 \sin 2x \, dx$

$-\frac{1}{2} du = \sin 2x \, dx$

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

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

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

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

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

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

method #1:

let $u = \sin x$

$du = \cos x \, dx$

$$= \int u \, du$$

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

$$= \frac{1}{2} \sin^2 x + C$$

method #2:

let $u = \cos x$

$du = -\sin x \, dx$

$-du = \sin x \, dx$

method #2:

$du = -\sin x\,dx$

$-du = \sin x\,dx$

$$= \int \sin x \cos x \, dx$$

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

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

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

method #3:

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

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