Section 28.1: cont'd

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④ $\int e^{7x}\left(1+e^{7x}\right)^5 dx$

let $u = 1+e^{7x}$
$du = 7e^{7x}\,dx$
$\frac{du}{7} = e^{7x}\,dx$

$= \int \frac{u^5\,du}{7}$

$= \frac{u^6}{42} + C$

$= \frac{\left(1+e^{7x}\right)^6}{42} + C$

⑤ $\int \frac{\tan^{-1} 2x}{1+4x^2}\,dx$

let $u = \tan^{-1} 2x$
$du = \frac{1}{1+4x^2}\,2\,dx$
$\frac{du}{2} = \frac{1}{1+4x^2}\,dx$

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

$= \frac{u^2}{4} + C$

$= \frac{\left(\tan^{-1} 2x\right)^2}{4} + C$

note: not $\tan^{-2} 2x$

⑥ $\int \sqrt{3+\tan\theta}\,\sec^2\theta\,d\theta$

let $u = 3+\tan\theta$
$du = \sec^2\theta\,d\theta$

(6) $\int \sqrt{3+\tan\theta}\ \sec^2\theta\, d\theta$

let $u = 3+\tan\theta$

$du = \sec^2\theta\, d\theta$

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

$$= \frac{2}{3} u^{3/2} + C$$

$$= \frac{2}{3}(3+\tan\theta)^{3/2} + C$$