Discussion 8.2

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

$u = \tan x$

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

$\int u \, du = \frac{u^2}{2} + C = \frac{1}{2}\tan^2 x + C$

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(45) $\int 4\tan^3 x \, dx = 4\int \tan^2 x \tan x \, dx$

$= 4\int (\sec^2 x - 1)\tan x \, dx = 4\int \sec^2 x \tan x \, dx - 4\int \tan x \, dx$

$= 4 \cdot \frac{1}{2}\tan^2 x - 4\int \frac{\sin x}{\cos x} \, dx$

$= 2\tan^2 x + 4\ln|\cos x| + C$

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(67) $\int x \sin^2 x \, dx = \int x \left(\frac{1 - \cos 2x}{2}\right) dx$

$= \frac{1}{2}\int x(1 - \cos 2x) \, dx = \frac{1}{2}\left[\int x \, dx - \int x\cos 2x \, dx\right]$

$= \frac{1}{2}\left[\frac{x^2}{2} - \frac{x}{2}\sin 2x - \frac{1}{4}\cos 2x\right] + C$

	+	
x	$\searrow$	$\cos 2x$
1	$\searrow$	$\frac{1}{2}\sin 2x$
0		$-\frac{1}{4}\cos 2x$

$= \frac{x^2}{4} - \frac{x}{4}\sin 2x - \frac{1}{8}\cos 2x + C$