13.3   # 2, 6, 11, 25, 33

#2 $\int \sin 5x \, dx$

$u = 5x$

$du = 5 \, dx$

$\frac{1}{5} du = dx$

$= \int \sin u \cdot \frac{1}{5} du = \frac{1}{5} \int \sin u \, du = -\frac{1}{5} \cos u + C$

$= -\frac{1}{5} \cos 5x + C$

#6 $\int 2x \cos(x^2) \, dx$ $u = x^2$
$du = 2x \, dx$

$= \int \cos u \, du = \sin u + C = \sin x^2 + C$

#11 $\int 3\sqrt{\cos x} \, \sin x \, dx$

$u = \cos x$

$du = -\sin x \, dx$

$-du = \sin x \, dx$

$= \int 3\sqrt{u} \cdot -du = -3 \int u^{\frac{1}{2}} \, du = -3 \cdot \frac{2}{3} u^{3/2} + C$

$= -2 (\cos x)^{3/2} + C$

#25

$$\int -6x\cos 5x \, dx$$

$u = -6x \qquad du = -6\,dx$
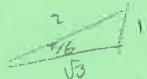
$dv = \cos 5x\,dx$

$v = \frac{1}{5}\sin 5x$

$$= -6x \cdot \frac{1}{5}\sin 5x - \int \frac{1}{5}\sin 5x \cdot -6\,dx$$

$$= -\frac{6}{5} \cdot \sin 5x + \frac{6}{5}\int \sin 5x \, dx$$

— like in #2

$$= -\frac{6}{5}\sin 5x + \frac{6}{5} \cdot -\frac{1}{5}\cos 5x + C$$

#33

$$\int_0^{\pi/6} \tan x \, dx = -\ln|\cos x| \Big|_0^{\pi/6} = -\ln|\cos \tfrac{\pi}{6}| - \left(-\ln|\cos 0|\right)$$

$\cos 0 = 1$

$$= -\ln \frac{\sqrt{3}}{2} + \ln 1 \qquad \ln 1 = 0$$

$\cos \pi/6 = \frac{\sqrt{3}}{2}$

$$= -\ln \frac{\sqrt{3}}{2}$$