ex.1

$$\int 2xe^{x^2}\,dx$$

$$= e^{x^2} + C$$

$F(x) = e^{x^2} + C$

$F'(x) = \boxed{2x} e^{\boxed{x^2}}$

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ex.2

$$\int \underbrace{(x^3+5)}_{u}^{100} \underbrace{(3x^2)\,dx}_{du}$$

$u = x^3 + 5$

$du = 3x^2\,dx$

$$= \int u^{100}\,du = \frac{1}{101}u^{101} + C$$

$$= \boxed{\frac{(x^3+5)^{101}}{101} + C} = \frac{1}{101}(x^3+5)^{101} + C$$

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ex.3

$$\frac{1}{2}\int \underbrace{2x}_{du} \cos \underbrace{\boxed{x^2}}_{u} \underbrace{dx}_{du}$$

$u = x^2$

$du = 2x\,dx$

$$\frac{1}{2}\int \cos u\,du = \frac{1}{2}\sin u + C$$

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

ex 4

$$\frac{1}{3}\int (\underbrace{3\sin x+4}_{u})^5 \underbrace{3\cos x\,dx}_{du}$$

$u = 3\sin x + 4$

$du = 3\cos x\,dx$

$$\frac{1}{3}\int u^5\,du = \frac{1}{3}\cdot\frac{1}{6}u^6 + C = \frac{1}{18}u^6 + C$$

$$= \frac{1}{18}(3\sin x+4)^6 + C$$

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ex 5

$$2\int \frac{\sin\sqrt{x}}{2\sqrt{x}}\,dx$$

$u = \sqrt{x} = x^{1/2}$

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

$= \frac{1}{2\sqrt{x}}dx$

$$2\int \underbrace{\sin\sqrt{x}}_{u}\underbrace{\left(\frac{1}{2\sqrt{x}}dx\right)}_{du}$$

$$2\int \sin u\,du = 2(-\cos u) + C$$

$$= -2\cos\sqrt{x} + C$$

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ex 6

$$\frac{1}{3}\int \frac{3x^2}{x^3+5}\,dx$$

$u = x^3+5$

$du = 3x^2\,dx$

$$\frac{1}{3}\int \frac{1}{\underbrace{x^3+5}_{u}}\underbrace{(3x^2)dx}_{du}$$

$$\frac{1}{3}\int \frac{1}{u}\,du = \frac{1}{3}\ln|u| + C$$

$$= \frac{1}{3}\ln|x^3+5| + C$$

$$\frac{1}{3}\int \frac{3x^2}{x^3+5}\,dx$$

$$\frac{1}{3}\ln|x^3+5| + C$$

ex 7 $\int \tan x \, dx = -\int \frac{-\sin x}{\cos x} dx$ $\quad u = \cos x$, $du = -\sin x \, dx$

$-\int \underbrace{\frac{1}{\cos x}}_{u} \underbrace{(-\sin x) dx}_{du}$

$= -\int \frac{1}{u} du = -\ln|u| + c$

$-\ln|\cos x| + c$

p.400
1, 3, 5, 9, 11, 13, 17, 27