P. 16

What you'll Learn About

- How to integrate a product by recognizing that one of the pieces contains the derivative of the other

$\frac{d}{dx}\left[\frac{1}{4}\sin(2x^2)+C\right]$

$\frac{1}{4}\cos(2x^2)4x$

$x\cos(2x^2)$

18) $\boxed{\int x\cos\left(2x^2\right)dx}$ $\quad u = 2x^2$

$\frac{du}{dx}=4x$

$\frac{du}{4x}=dx$

$\int \cancel{x}\cos(u)\frac{du}{4\cancel{x}}$

$\frac{1}{4}\int \cos(u)\,du = \frac{1}{4}\sin(u)+C$

$=\boxed{\frac{1}{4}\sin(2x^2)+C}$

21) $\int \frac{dx}{x^2+9}$ $\quad u = \frac{x}{3}$

$\frac{d}{dx}(\arctan x)$

$\frac{1}{x^2+1}$

$\int \frac{1}{x^2+9}\,dx = (\quad)\arctan\left(\frac{x}{3}\right)$

24) $\int 8\left(x^4+4x^2+1\right)^2\left(x^3+2x\right)dx \quad u = x^4+4x^2+1$

$$\int x \cos(2x^2)\,dx = \boxed{\frac{1}{4}\sin(2x^2) + C}$$

P.18

$u = 7x + 5$ $\frac{du}{dx} = 7$ $\frac{du}{7} = dx$	D) $\int \cos(7x+5)dx = \boxed{\frac{1}{7}\sin(7x+5) + C}$ $\int \cos(u)\frac{du}{7}$ ✓ $\frac{1}{7}\cos(7x+5)\cdot 7$ $\frac{1}{7}\int \cos(u)du = \frac{1}{7}\sin(u) + C = \frac{1}{7}\sin(7x+5) + C$ E) $\int x^2 \sin(x^3) dx = \boxed{-\frac{1}{3}\cos(x^3) + C}$ ✓ $\sin(x^3)\cdot 3x^2$ F) $\int \sin^4 x \cos x dx = \int (\sin x)^4 \cos x dx = \boxed{\frac{1}{5}(\sin x)^5 + C}$ ✓ $(\sin x)^4 \cdot \cos x$ ✓

$G) \quad \int \tan x \sec^2 x dx = \int (\tan x)^1 (\sec x)^2 dx = \boxed{\frac{1}{2}(\tan x)^2 + C}$

$\checkmark \quad (\tan x)^1 \cdot \sec^2 x$

$u = 4 + 3\sin x$

$\int_4^4 \quad = 0$

$58) \quad \int_{-\pi}^{\pi} \frac{\cos x}{\sqrt{4+3\sin x}} dx = \int_{-\pi}^{\pi} \underline{\cos x (4+3\sin x)^{-1/2}} dx$

$= \frac{2 \cdot 1}{3}(4+3\sin x)^{1/2} \Big]_{-\pi}^{\pi}$

$\checkmark \quad \underline{(4+3\sin x)^{-1/2} \cdot 3\cos x}$

$\frac{2}{3}(\sqrt{4}) - \frac{2}{3}\sqrt{4} = 0$

$J) \quad \int \frac{1}{x^2+81} dx$

$K) \quad \int \frac{1}{x^2+16} dx$