Key

PROBLEM 4. Evaluate $\int \tan\frac{x}{3}\ \sec^2\frac{x}{3}dx$.

Answer: Let $u = \tan\frac{x}{3}$ and $du = \frac{1}{3}\sec^2\frac{x}{3}dx$. Then $3du = \sec^2\frac{x}{3}dx$.

Substituting, we get:

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

Then substitute back:

$$\frac{3}{2}\tan^2\frac{x}{3} + C$$

PRACTICE PROBLEM SET 21

Now evaluate the following integrals. The answers are in Chapter 21.

1. $\int \sin 2x \cos 2x\ dx$ $\quad \frac{\sin^2 2x + C}{4}$
2. $\int \frac{3x\ dx}{\sqrt[3]{10-x^2}}$ $\quad -\frac{9}{4}(10-x^2)^{2/3} + C$
3. $\int x^3\sqrt{5x^4+20}\ dx$ $\quad \frac{1}{30}(5x^4+20)^{3/2} + C$
4. $\int \frac{dx}{(x-1)^2}$ $\quad -\frac{1}{x-1} + C$
5. $\int (x^2+1)(x^3+3x)^{-5}\ dx$ $\quad -\frac{1}{12(x^3+3x)^4} + C$
6. $\int \frac{1}{\sqrt{x}}\sin\sqrt{x}\ dx$ $\quad -2\cos\sqrt{x} + C$
7. $\int x^2\sec^2 x^3\ dx$ $\quad \frac{1}{3}\tan(x^3) + C$
8. $\int \frac{\cos\left(\frac{3}{x}\right)}{x^2}dx$ $\quad -\frac{1}{3}\sin\left(\frac{3}{x}\right) + C$
9. $\int \frac{\sin 2x}{(1-\cos 2x)^3}dx$ $\quad -\frac{1}{4}(1-\cos 2x)^{-2} + C$
10. $\int \sin(\sin x)\cos x\ dx$ $\quad -\cos(\sin x) + C$

P.S. 21