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 $3\,du = \sec^2\frac{x}{3}\,dx$.

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. $\int \sin 2x \cos 2x\,dx$

2. $\int \dfrac{3x\,dx}{\sqrt[3]{10 - x^2}}$

3. $\int x^3\sqrt{5x^4 + 20}\,dx$

4. $\int \dfrac{dx}{(x-1)^2}$

5. $\int (x^2 + 1)(x^3 + 3x)^{-5}\,dx$

6. $\int \dfrac{1}{\sqrt{x}}\sin\sqrt{x}\,dx$

7. $\int x^2\sec^2 x^3\,dx$

8. $\int \dfrac{\cos\left(\dfrac{3}{x}\right)}{x^2}\,dx$

9. $\int \dfrac{\sin 2x}{(1 - \cos 2x)^3}\,dx$

10. $\int \sin(\sin x)\cos x\,dx$