



Indefinite Integrals Ex 19.8 Q25

$$\text{Let } I = \int \frac{e^{2x}}{e^{2x} - 2} dx \text{ ----- (i)}$$

$$\begin{aligned} \text{Let } e^{2x} - 2 &= t \quad \text{then,} \\ d(e^{2x} - 2) &= dt \end{aligned}$$

$$\Rightarrow 2e^{2x} dx = dt$$

$$\Rightarrow dx = \frac{dt}{2e^{2x}}$$

Putting $e^{2x} - 2 = t$ and $dx = \frac{dt}{2e^{2x}}$ in equation (i), we get,

$$\begin{aligned} I &= \int \frac{2e^{2x}}{t} \times \frac{dt}{2e^{2x}} \\ &= \frac{1}{2} \int \frac{dt}{t} \\ &= \frac{1}{2} \log|t| + c \\ &= \frac{1}{2} \log|e^{2x} - 2| + c \end{aligned}$$

$$\therefore \quad = \frac{1}{2} \log|e^{2x} - 2| + c$$

Indefinite Integrals Ex 19.8 Q26

$$\frac{2 \cos x - 3 \sin x}{6 \cos x + 4 \sin x} = \frac{2 \cos x - 3 \sin x}{2(3 \cos x + 2 \sin x)}$$

$$\text{Let } 3 \cos x + 2 \sin x = t$$

$$(-3 \sin x + 2 \cos x) dx = dt$$

$$\begin{aligned} \int \frac{2 \cos x - 3 \sin x}{6 \cos x + 4 \sin x} dx &= \int \frac{dt}{2t} \\ &= \frac{1}{2} \int \frac{1}{t} dt \\ &= \frac{1}{2} \log |t| + C \\ &= \frac{1}{2} \log |2 \sin x + 3 \cos x| + C \end{aligned}$$

Indefinite Integrals Ex 19.8 Q27

$$\text{Let } I = \int \frac{\cos 2x + x + 1}{x^2 + \sin 2x + 2x} dx \text{ ----- (i)}$$

$$\text{Let } x^2 + \sin 2x + 2x = t \text{ then,}$$

$$d(x^2 + \sin 2x + 2x) = dt$$

$$\Rightarrow (2x + 2 \cos 2x + 2) dx = dt$$

$$\Rightarrow 2(\cos 2x + x + 1) dx = dt$$

$$\Rightarrow dx = \frac{dt}{2(\cos 2x + x + 1)}$$

Putting $x^2 + \sin 2x + 2x = t$ and $dx = \frac{dt}{2(\cos 2x + x + 1)}$ in equation (i), we get,

$$\begin{aligned} I &= \int \frac{\cos 2x + x + 1}{t} \times \frac{dt}{2(\cos 2x + x + 1)} \\ &= \frac{1}{2} \int \frac{dt}{t} \\ &= \frac{1}{2} \log |t| + c \\ &= \frac{1}{2} \log |x^2 + \sin 2x + 2x| + c \end{aligned}$$

$$\therefore I = \frac{1}{2} \log |x^2 + \sin 2x + 2x| + c$$

Indefinite Integrals Ex 19.8 Q29

$$\text{Let } I = \int \frac{-\sin x + 2 \cos x}{2 \sin x + \cos x} dx \text{ ----- (i)}$$

$$\text{Let } 2 \sin x + \cos x = t \quad \text{then,} \\ d(2 \sin x + \cos x) = dt$$

$$\Rightarrow (2 \cos x - \sin x) dx = dt$$

$$\Rightarrow dx = \frac{dt}{-\sin x + 2 \cos x}$$

Putting $2 \sin x + \cos x = t$ and $dx = \frac{dt}{-\sin x + 2 \cos x}$ in equation (i), we get,

$$\begin{aligned} I &= \int \frac{-\sin x + 2 \cos x}{t} \times \frac{dt}{-\sin x + 2 \cos x} \\ &= \int \frac{dt}{t} \\ &= \log|t| + c \\ &= \log|2 \sin x + \cos x| + c \end{aligned}$$

$$\therefore I = \log|2 \sin x + \cos x| + c$$

Indefinite Integrals Ex 19.8 Q30

$$\int \frac{\cos 4x - \cos 2x}{\sin 4x - \sin 2x} dx$$

$$= -\int \frac{2 \sin 3x \sin x}{2 \cos 3x \sin x} dx$$

$$= -\int \frac{\sin 3x}{\cos 3x} dx$$

Putting $\cos 3x = t$, and $-3 \sin 3x dx = dt$

$$= \frac{1}{3} \int \frac{dt}{t}$$

$$= \frac{1}{3} \log|t| + c$$

$$= \frac{1}{3} \log|\cos 3x| + C$$

***** END *****