



Indefinite Integrals Ex 19.9 Q25

$$\text{Let } I = \int \frac{1 + \cos x}{(x + \sin x)^3} dx \text{ ----- (i)}$$

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

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

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

$$\begin{aligned} I &= \int \frac{dt}{t^3} \\ &= \int t^{-3} dt \\ &= \frac{t^{-2}}{-2} + C \\ &= -\frac{1}{2t^2} + C \\ &= \frac{-1}{2(x + \sin x)^2} + C \end{aligned}$$

$$\therefore I = \frac{-1}{2(x + \sin x)^2} + C$$

Indefinite Integrals Ex 19.9 Q26

$$\begin{aligned} \frac{\cos x - \sin x}{1 + \sin 2x} &= \frac{\cos x - \sin x}{(\sin^2 x + \cos^2 x) + 2 \sin x \cos x} \\ &\quad [\sin^2 x + \cos^2 x = 1; \sin 2x = 2 \sin x \cos x] \\ &= \frac{\cos x - \sin x}{(\sin x + \cos x)^2} \end{aligned}$$

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

$$\therefore (\cos x - \sin x) dx = dt$$

$$\begin{aligned} \Rightarrow \int \frac{\cos x - \sin x}{1 + \sin 2x} dx &= \int \frac{\cos x - \sin x}{(\sin x + \cos x)^2} dx \\ &= \int \frac{dt}{t^2} \\ &= \int t^{-2} dt \\ &= -t^{-1} + C \\ &= -\frac{1}{t} + C \\ &= \frac{-1}{\sin x + \cos x} + C \end{aligned}$$

Indefinite Integrals Ex 19.9 Q27

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

$$\text{Let } a + b \cos 2x = t \quad \text{then,}$$

$$d(a + b \cos 2x) = dt$$

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

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

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

$$\begin{aligned} I &= \int \frac{1}{t^2} \times \frac{-dt}{2b} \\ &= \frac{-1}{2b} \int t^{-2} dt \\ &= -\frac{1}{2b} \{-1t^{-1}\} + c \\ &= \frac{1}{2bt} + c \\ &= \frac{1}{2b(a + b \cos 2x)} + c \end{aligned}$$

$$\therefore I = \frac{1}{2b(a + b \cos 2x)} + c$$

Indefinite Integrals Ex 19.9 Q28

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

$$\text{Let } \log x = t \quad \text{then,}$$

$$d(\log x) = dt$$

$$\Rightarrow \frac{1}{x} dx = dt$$

$$\Rightarrow \frac{dx}{x} = dt$$

$$\text{Now, } I = \int \frac{\log x^2}{x} dx$$

$$= \int \frac{2 \log x}{x} dx$$

$$= 2 \int \frac{\log x}{x} dx \text{ ---- (ii)}$$

Putting $\log x = t$ and $\frac{dx}{x} = dt$ in equation (ii), we get

$$I = 2 \int t dt$$

$$= \frac{2t^2}{2} + c$$

$$= t^2 + c$$

$$\therefore I = (\log x)^2 + c$$

Indefinite Integrals Ex 19.9 Q29

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

$$\text{Let } 1 + \cos x = t \text{ then,}$$

$$d(1 + \cos x) = dt$$

$$\Rightarrow -\sin x dx = dt$$

$$\Rightarrow \sin x dx = -dt$$

Putting $1 + \cos x = t$ and $\sin x dx = -dt$ in equation (i), we get

$$I = \int \frac{-dt}{t^2}$$

$$= -\int t^{-2} dt$$

$$= -\left(-t^{-1}\right) + C$$

$$= \frac{1}{t} + C$$

$$= \frac{1}{1 + \cos x} + C$$

$$\therefore I = \frac{1}{1 + \cos x} + C$$

***** END *****