Indefinite Integrals Ex 19.8 Q25

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

Let $e^{2x}-2=t$ then,

$d\left(e^{2x}-2\right)=dt$

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

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

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

$$I = \int \frac{2e^{2x}}{t} \times \frac{dt}{2e^{2x}}$$

$$= \frac{1}{2}\int \frac{dt}{t}$$

$$= \frac{1}{2}\log|t| + c$$

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

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

Indefinite Integrals Ex 19.8 Q26

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

Let $3\cos x+2\sin x=t$

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

$$\int\frac{2\cos x-3\sin x}{6\cos x+4\sin x}\,dx=\int\frac{dt}{2t}$$

$$=\frac{1}{2}\int\frac{1}{t}dt$$

$$=\frac{1}{2}\log|t|+C$$

$$=\frac{1}{2}\log|2\sin x+3\cos x|+C$$

Indefinite Integrals Ex 19.8 Q27

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

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

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

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

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

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

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

$$I=\int\frac{\cos 2x+x+1}{t}\times\frac{dt}{2(\cos 2x+x+1)}$$

$$=\frac{1}{2}\int\frac{dt}{t}$$

$$=\frac{1}{2}\log|t|+c$$

$$=\frac{1}{2}\log\left|x^2+\sin 2x+2x\right|+c$$

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

Indefinite Integrals Ex 19.8 Q29

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

Let $2\sin x + \cos x = t$ then,

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

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

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

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

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

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

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 **********