Indefinite Integrals Ex 19.2 Q22

$$\int\left(\sec^2 x + \cos ec^2 x\right)dx$$

$$= \int \sec^2 x dx + \int \cos ec^2 x dx$$
$$= \tan x - \cot x + c$$

$$\therefore \quad \int\left(\sec^2 x + \cos ec^2 x\right)dx = \tan x - \cot x + c$$

Indefinite Integrals Ex 19.2 Q23

Evaluate the integral as follows

$$\int \frac{\sin^3 x - \cos^3 x}{\sin^2 x \cos^2 x}dx = \int\left(\frac{\sin^3 x}{\sin x^2 \cos^2 x} - \frac{\cos^3 x}{\sin x^2 \cos^2 x}\right)dx$$
$$= \int\left(\sin x \sec^2 x - \cos x \cos ec^2 x\right)dx$$
$$= \int\left(\tan x \sec x - \cot x \cos ec x\right)dx$$
$$= \sec x + \cos ec x + C$$

Indefinite Integrals Ex 19.2 Q24

$$\mathrm{I} \int \frac{5\cos^3 x + 6\sin^3 x}{2\sin^2 x \cos^2 x}dx$$

Now,

$$\mathrm{I} = \int \frac{5\cos^3 x + \sin^3 x}{2\sin^2 x \cos^2 x}dx$$
$$= \int \frac{5\cos^3 x}{2\sin^2 x \cos^2 x}dx + \int \frac{6\sin^3 x}{2\sin^2 x \cos^2 x}dx$$
$$= \frac{5}{2}\int \frac{\cos x}{\sin^2 x}dx + 3\int \frac{\sin x}{\cos^2 x}dx$$
$$= \frac{5}{2}\int \cot x \cos ec x dx + 3\int \sec x \tan x dx$$
$$= + \frac{-5}{2}\cos ec x + 3\sec x + c$$

$$\therefore \quad \mathrm{I} = \frac{-5}{2}\cos \sec x + 3\sec x + c$$

Indefinite Integrals Ex 19.2 Q25

$\int (\tan x + \cot x)^2 dx$

$$= \int \left(\tan^2 x + \cot^2 x + 2 \tan x \cot x\right) dx$$
$$= \int \left(\sec^2 x - 1 + \operatorname{cosec}^2 x - 1 + \frac{2 \times 1}{\cot x} \cot x\right) dx$$
$$= \int \left(\sec^2 x + \operatorname{cosec}^2 x\right) dx$$
$$= \int \sec^2 x dx + \int \operatorname{cosec}^2 x$$
$$= \tan x - \cot x + c$$

$\therefore \quad \int (\tan x + \cot x)^2 = \tan x - \cot x + c$

Indefinite Integrals Ex 19.2 Q26

$\int \frac{1 - \cos 2x}{1 + \cos 2x} dx$

$$= \int \frac{2 \sin^2 x}{2 \cos^2 x} dx$$
$$= \int \tan^2 x dx$$
$$= \int \left(\sec^2 x - 1\right) dx$$
$$= \int \sec^2 x dx - \int dx$$
$$= \tan x - x + c$$

$\therefore \quad \int \frac{1 - \cos 2x}{1 + \cos 2x} dx = \tan x - x + c$

Indefinite Integrals Ex 19.2 Q27

$\int \frac{\cos x}{1 - \cos x} dx$

$$= \int \frac{\cos x (1 + \cos x)}{(1 - \cos x)(1 + \cos x)} dx$$
$$= \int \frac{\cos x + \cos^2 x}{1 - \cos^2 x} dx$$
$$= \int \frac{\cos x + \cos^2 x}{\sin^2 x} dx$$
$$= \int \frac{\cos x}{\sin^2 x} dx + \int \frac{\cos^2 x}{\sin^2 x} dx$$
$$= \int \cot x \times \operatorname{cosec} x dx + \int \left(\operatorname{cosec}^2 x - 1\right) dx$$
$$= -\operatorname{cosec} x - \cot x - x + c$$

$\therefore \quad \int \frac{\cos x}{1 - \cos x} \times dx = -\operatorname{cosec} x - \cot x - x + c$

Indefinite Integrals Ex 19.2 Q28

$$\int \frac{\cos^2 x - \sin^2 x}{\sqrt{1+\cos 4x}} dx$$

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

$$= \frac{1}{\sqrt{2}} \int \frac{\cos^2 x - \sin^2 x}{\cos 2x} dx$$

$$= \frac{1}{\sqrt{2}} \int \frac{\cos^2 x - \sin^2 x}{\cos^2 x - \sin^2 x} dx \qquad \left[\because \cos 2x = \cos^2 x - \sin^2 x\right]$$

$$= \frac{1}{\sqrt{2}} \int 1 \times dx$$

$$= \frac{x}{\sqrt{2}} + c$$

$$\therefore \quad \int \frac{\cos^2 x - \sin^2 x}{\sqrt{1+\cos 4x}} \times dx = \frac{x}{\sqrt{2}} + c$$

*********** END **********