Indefinite Integrals Ex 19.2 Q29

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

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

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

$$= \int \frac{1 + \cos x}{\sin^2 x} \times dx$$

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

$$= \int \csc^2 x \, dx + \int \cot x \times \csc x \, dx$$

$$= -\cot x - \csc x + c$$

$$\therefore \qquad \int \frac{1}{1 - \cos x} dx = -\cot x - \csc x + c.$$

Indefinite Integrals Ex 19.2 Q30

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

$$= \int \frac{1}{1 - \sin x} \times \frac{1 + \sin x}{1 + \sin x} \times dx$$

$$= \int \frac{1 + \sin x}{1 - \sin^2 x} \times dx$$

$$= \int \frac{1 + \sin x}{\cos^2 x} \times dx$$

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

$$=$$

$$= \int \frac{1}{\cos^2 x} dx + \int \frac{\sin x}{\cos^2 x} \times dx$$

$$= \int \sec^2 x \, dx + \int \tan x \, \sec x \, dx$$

$$= \tan x + \sec x + c$$

$$\therefore \qquad \int \frac{1}{1 - \sin x} \times dx = \tan x + \sec x + c.$$

Indefinite Integrals Ex 19.2 Q31

$$\int \frac{\tan x}{\sec x + \tan x} \times dx$$

$$= \int \frac{\tan x}{\sec x + \tan x} \times \frac{\sec x - \tan x}{\sec x - \tan x} \times dx$$

$$= \int \frac{\tan x (\sec x - \tan x)}{\sec^2 x - \tan^2 x} \times dx$$

$$= \int \left(\tan x \sec x - \tan^2 x \right) dx$$

$$= \int \sec \tan x \, dx - \int \left(\sec^2 x - 1 \right) dx$$

$$= \int \sec x \tan x \, dx - \int \sec^2 x \, dx + \int dx$$

$$= \sec x - \tan x + x + c$$

$$\therefore \quad \int \frac{\tan x}{\sec x + \tan x} \times dx = \sec x - \tan x + x + c.$$

Indefinite Integrals Ex 19.2 Q32

$$\int \frac{\cosec x}{\cosec x - \cot x} \times dx$$

$$= \int \frac{\cosec x}{\cosec x - \cot x} \times \frac{\cosec x + \cot x}{\cosec x + \cot x} \times dx$$

$$= \int \frac{\cosec x (\cosec x + \cot x)}{\cosec^2 x - \cot^{2x}} \times dx$$

$$= \int \left(\cosec^2 x + \cosec x \cot x \right) dx$$

$$= \int \cosec^2 x \, dx + \int \cosec x \, dx$$

$$= - \cot x - \cosec x + c$$

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

Indefinite Integrals Ex 19.2 Q33

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

$$= \int \frac{1}{2 \cos^2 x} \times dx$$

$$= \frac{1}{2} \int \sec^2 x \times dx$$

$$= \frac{1}{2} \times \tan x + c$$

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

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

Indefinite Integrals Ex 19.2 Q34

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

$$= \int \frac{1}{2 \sin^2 x} \times dx$$

$$= \frac{1}{2} \int \mathrm{co \, sec}^2 x \times dx$$

$$= \frac{-1}{2} \times \cot x + c$$

$$= \frac{-1 \cot x}{2} + c$$

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

Indefinite Integrals Ex 19.2 Q35

$$\int \tan^{-1} \left[\frac{\sin 2x}{1 + \cos 2x} \right] dx$$

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

$$= \int \tan^{-1} \left[\frac{\sin x}{\cos x} \right] dx$$

$$= \int \tan^{-1} (\tan x) \, dx$$

$$= \int x \, dx$$

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

$$\therefore \quad \int \tan^{-1} \left[\frac{\sin 2x}{1 + \cos 2x} \right] dx = \frac{x^2}{2} + c.$$

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