



Indefinite Integrals Ex 19.2 Q29

$$\begin{aligned}\int \frac{1}{1 - \cos x} dx &= \int \frac{1}{1 - \cos x} \times \frac{1 + \cos x}{1 + \cos x} \times dx \\&= \int \frac{1 + \cos x}{1 - \cos^2 x} \times dx \\&= \int \frac{1 + \cos x}{\sin^2 x} \times dx \\&= \int \frac{1}{\sin^2 x} dx + \int \frac{\cos x}{\sin^2 x} dx \\&= \int \operatorname{cosec}^2 x dx + \int \cot x \times \operatorname{cosec} x dx \\&= -\cot x - \operatorname{cosec} x + c \\ \therefore \int \frac{1}{1 - \cos x} dx &= -\cot x - \operatorname{cosec} x + c.\end{aligned}$$

Indefinite Integrals Ex 19.2 Q30

$$\begin{aligned}\int \frac{1}{1 - \sin x} dx &= \int \frac{1}{1 - \sin x} \times \frac{1 + \sin x}{1 + \sin x} \times dx \\&= \int \frac{1 + \sin x}{1 - \sin^2 x} \times dx \\&= \int \frac{1 + \sin x}{\cos^2 x} \times dx \\&= \int \left(\frac{1}{\cos^2 x} + \frac{\sin x}{\cos^2 x} \right) \times dx \\&= \int \frac{1}{\cos^2 x} dx + \int \frac{\sin x}{\cos^2 x} \times dx \\&= \int \sec^2 x dx + \int \tan x \sec x dx \\&= \tan x + \sec x + c \\ \therefore \int \frac{1}{1 - \sin x} \times dx &= \tan x + \sec x + c.\end{aligned}$$

Indefinite Integrals Ex 19.2 Q31

$$\begin{aligned}
& \int \frac{\tan x}{\sec x + \tan x} \times dx \\
&= \int \frac{\tan x}{\sec x + \tan x} \times \frac{\sec x - \tan x}{\sec x - \tan x} \times dx \\
&= \int \frac{\tan x (\sec x - \tan x)}{\sec^2 x - \tan^2 x} \times dx \\
&= \int (\tan x \sec x - \tan^2 x) dx \\
&= \int \sec \tan x dx - \int (\sec^2 x - 1) dx \\
&= \int \sec x \tan x dx - \int \sec^2 x dx + \int dx \\
&= \sec x - \tan x + x + c \\
\therefore \int \frac{\tan x}{\sec x + \tan x} \times dx &= \sec x - \tan x + x + c.
\end{aligned}$$

Indefinite Integrals Ex 19.2 Q32

$$\begin{aligned}
& \int \frac{\operatorname{cosec} x}{\operatorname{cosec} x - \cot x} \times dx \\
&= \int \frac{\operatorname{cosec} x}{\operatorname{cosec} x - \cot x} \times \frac{\operatorname{cosec} x + \cot x}{\operatorname{cosec} x + \cot x} \times dx \\
&= \int \frac{\operatorname{cosec} x (\operatorname{cosec} x + \cot x)}{\operatorname{cosec}^2 x - \cot^2 x} \times dx \\
&= \int (\operatorname{cosec}^2 x + \operatorname{cosec} x \cot x) dx \\
&= \int \operatorname{cosec}^2 x dx + \int \operatorname{cosec} x dx \\
&= -\cot x - \operatorname{cosec} x + c \\
\therefore \int \frac{\operatorname{cosec} x}{\operatorname{cosec} x - \cot x} \times dx &= -\cot x - \operatorname{cosec} x + c.
\end{aligned}$$

Indefinite Integrals Ex 19.2 Q33

$$\begin{aligned}
& \int \frac{1}{1 + \cos 2x} \times dx \\
&= \int \frac{1}{2 \cos^2 x} \times dx \\
&= \frac{1}{2} \int \sec^2 x \times dx \\
&= \frac{1}{2} \times \tan x + c \\
&= \frac{\tan x}{2} + c \\
\therefore \int \frac{1}{1 + \cos 2x} \times dx &= \frac{1}{2} \tan x + c.
\end{aligned}$$

Indefinite Integrals Ex 19.2 Q34

$$\begin{aligned}
 \int \frac{1}{1 - \cos 2x} dx &= \int \frac{1}{2 \sin^2 x} \times dx \\
 &= \frac{1}{2} \int \operatorname{cosec}^2 x \times dx \\
 &= \frac{-1}{2} \times \cot x + c \\
 &= \frac{-1 \cot x}{2} + c
 \end{aligned}$$

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

Indefinite Integrals Ex 19.2 Q35

$$\begin{aligned}
 \int \tan^{-1} \left[\frac{\sin 2x}{1 + \cos 2x} \right] dx &= \int \tan^{-1} \left[\frac{2 \sin x \cos x}{2 \cos^2 x} \right] dx \\
 &= \int \tan^{-1} \left[\frac{\sin x}{\cos x} \right] dx \\
 &= \int \tan^{-1} (\tan x) dx \\
 &= \int x dx \\
 &= \frac{x^2}{2} + c
 \end{aligned}$$

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

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