



Indefinite Integrals Ex 19.8 Q41

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

$$\begin{aligned} \text{Let } \tan x + 2 &= t \quad \text{then,} \\ d(\tan x + 2) &= dt \end{aligned}$$

$$\Rightarrow \sec^2 x dx = dt$$

$$\Rightarrow dx = \frac{1}{\sec^2 x} dt$$

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

$$\begin{aligned} I &= \int \frac{\sec^2 x}{t} \times \frac{1}{\sec^2 x} dt \\ &= \int \frac{dt}{t} \\ &= \log|t| + c \\ &= \log|\tan x + 2| + c \end{aligned}$$

$$\Rightarrow I = \log|\tan x + 2| + c$$

Indefinite Integrals Ex 19.8 Q42

$$\text{Let } I = \int \frac{2 \cos 2x + \sec^2 x}{\sin 2x + \tan x - 5} dx \text{ ----- (i)}$$

$$\begin{aligned} \text{Let } \sin 2x + \tan x - 5 &= t \quad \text{then,} \\ d(\sin 2x + \tan x - 5) &= dt \end{aligned}$$

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

$$\Rightarrow dx = \frac{1}{2 \cos 2x + \sec^2 x} dt$$

Putting $\sin 2x + \tan x - 5 = t$ and $dx = \frac{dt}{2 \cos 2x + \sec^2 x}$ in equation (i), we get,

$$\begin{aligned} I &= \int \frac{2 \cos 2x + \sec^2 x}{t} \times \frac{1}{2 \cos 2x + \sec^2 x} dt \\ &= \int \frac{dt}{t} \\ &= \log|t| + c \\ &= \log|\sin 2x + \tan x - 5| + c \end{aligned}$$

$$\therefore I = \log|\sin 2x + \tan x - 5| + c$$

Indefinite Integrals Ex 19.8 Q43

Let $I = \int \frac{\sin 2x}{\sin 5x \sin 3x} dx$ then,

$$\begin{aligned}
 I &= \int \frac{\sin(5x - 3x)}{\sin 5x \sin 3x} dx \\
 &= \int \frac{\sin 5x \cos 3x - \cos 5x \sin 3x}{\sin 5x \sin 3x} dx \\
 &= \int \frac{\sin 5x \cos 3x}{\sin 5x \sin 3x} dx - \int \frac{\cos 5x \sin 3x}{\sin 5x \sin 3x} dx \\
 &= \int \frac{\cos 3x}{\sin 3x} dx - \int \frac{\cos 5x}{\sin 5x} dx \\
 &= \int \cot 3x dx - \int \cot 5x dx \\
 &= \frac{1}{3} \log |\sin 3x| - \frac{1}{5} \log |\sin 5x| + c
 \end{aligned}$$

$\therefore I = \frac{1}{3} \log |\sin 3x| - \frac{1}{5} \log |\sin 5x| + c$

Indefinite Integrals Ex 19.8 Q44

Let $I = \int \frac{1 + \cot x}{x + \log \sin x} dx$ ----- (i)

Let $x + \log \sin x = t$ then,
 $d(x + \log \sin x) = dt$

$$\begin{aligned}
 \Rightarrow (1 + \cot x) dx &= dt & \left[\because \frac{d}{dx} (\log \sin x) = \cot x \right] \\
 \Rightarrow dx &= \frac{dt}{1 + \cot x}
 \end{aligned}$$

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

$$\begin{aligned}
 I &= \int \frac{1 + \cot x}{t} \times \frac{dt}{1 + \cot x} \\
 &= \int \frac{dt}{t} \\
 &= \log |t| + c \\
 &= \log |x + \log \sin x| + c
 \end{aligned}$$

$\therefore I = \log |x + \log \sin x| + c$

Indefinite Integrals Ex 19.8 Q45

Let $I = \int \frac{1}{\sqrt{x}(\sqrt{x}+1)} dx \text{ ----- (i)}$

Let $\sqrt{x} + 1 = t$ then,
 $d(\sqrt{x} + 1) = dt$

$$\Rightarrow \frac{1}{2\sqrt{x}} dx = dt$$

$$\Rightarrow dx = 2\sqrt{x} dt$$

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

$$I = \int \frac{1}{\sqrt{x} t} \times 2\sqrt{x} dt$$

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

$$= 2 \log|t| + c$$

$$= 2 \log|\sqrt{x} + 1| + c$$

$$\therefore I = 2 \log|\sqrt{x} + 1| + c$$

***** END *****