



Indefinite Integrals Ex 19.22 Q9

$$\begin{aligned}\text{Let } I &= \int \frac{1}{\cos x (\sin x + 2 \cos x)} dx \\ &= \int \frac{1}{\sin x \cos x + 2 \cos^2 x} dx\end{aligned}$$

Dividing numerator and denominator by $\cos^2 x$,

$$I = \int \frac{\sec^2 x}{\tan x + 2} dx$$

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

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

Indefinite Integrals Ex 19.22 Q10

$$\begin{aligned}\text{Let } I &= \int \frac{1}{\sin^2 x + \sin 2x} dx \\ &= \int \frac{1}{\sin^2 x + 2 \sin x \cos x} dx\end{aligned}$$

Dividing numerator and denominator by $\cos^2 x$,

$$I = \int \frac{\sec^2 x}{\tan^2 x + 2 \tan x} dx$$

$$\begin{aligned}\text{Let } \tan x &= t \\ \sec^2 x dx &= dt \\ &= \int \frac{dt}{t^2 + 2t + (1)^2 - (1)^2} \\ &= \int \frac{dt}{(t+1)^2 - (1)^2} \\ &= \frac{1}{2} \log \left| \frac{t+1-1}{t+1+1} \right| + c \\ &= \frac{1}{2} \log \left| \frac{t}{t+2} \right| + c\end{aligned}$$

$$I = \frac{1}{2} \log \left| \frac{\tan x}{\tan x + 2} \right| + c$$

Indefinite Integrals Ex 19.22 Q11

$$\begin{aligned}\text{Let } I &= \int \frac{1}{\cos 2x + 3 \sin^2 x} dx \\ &= \int \frac{1}{2 \cos^2 x - 1 + 3 \sin^2 x} dx\end{aligned}$$

Dividing numerator and denominator by $\cos^2 x$,

$$\begin{aligned}I &= \int \frac{\sec^2 x}{2 - \sec^2 x + 3 \tan^2 x} dx \\ &= \int \frac{\sec^2 x}{2 - (1 + \tan^2 x) + 3 \tan^2 x} dx \\ &= \int \frac{\sec^2 x}{2 - 1 - \tan^2 x + 3 \tan^2 x} dx \\ &= \int \frac{dt}{1 + 2 \tan^2 x}\end{aligned}$$

$$\begin{aligned}\text{Let } \sqrt{2} \tan x &= t \\ \sqrt{2} \sec^2 x dx &= dt \\ I &= \frac{1}{\sqrt{2}} \int \frac{1}{1 + t^2} \\ &= \frac{1}{\sqrt{2}} \tan^{-1} t + c\end{aligned}$$

$$I = \frac{1}{\sqrt{2}} \tan^{-1} (\sqrt{2} \tan x) + c$$

***** END *****