

$$\int \sec x \, dx$$

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$$\sec x =$$

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$$\sec x = \frac{1}{\cos x}$$

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$$\sec x = \frac{1}{\cos x} = \frac{\cos x}{\cos^2 x}$$

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$$\int \sec x \, dx$$

$$\begin{aligned}\sec x &= \frac{1}{\cos x} = \frac{\cos x}{\cos^2 x} = \frac{\cos x}{1 - \sin^2 x} = \frac{\cos x}{(1 - \sin x)(1 + \sin x)} \\ &= \frac{1}{2} \left(\frac{\cos x}{1 - \sin x} + \frac{\cos x}{1 + \sin x} \right)\end{aligned}$$

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$$\begin{aligned}\int \sec x \, dx &= \int \frac{1}{2} \left(\frac{\cos x}{1 - \sin x} + \frac{\cos x}{1 + \sin x} \right) dx \\ &= \frac{1}{2} \{-\ln(1 - \sin x) + \ln(1 + \sin x)\} + c\end{aligned}$$

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$$\therefore \int \sec x \, dx = \ln |\sec x + \tan x| + c$$

$$\int \sec x \, dx$$

END