

55.

 $\int \frac{x + \sin x}{1 + \cos x} dx$ is equal to

(A) $\log|1 + \cos x| + C$

(B) $\log|x + \sin x| + C$

(C) $x - \tan \frac{x}{2} + C$

(D) $x \cdot \tan \frac{x}{2} + C$

$$\begin{aligned} & \int \frac{x + \sin x}{1 + \cos x} dx \\ &= \int \frac{x + \sin x}{2 \cos^2 \frac{x}{2}} = \int \frac{x dx}{2 \cos^2 \frac{x}{2}} + \int \frac{2 \sin \frac{x}{2} \cos \frac{x}{2} dx}{2 \cos^2 \frac{x}{2}} \\ &= \frac{1}{2} \int x \sec^2 \frac{x}{2} + \int \tan \frac{x}{2} dx \\ &= \frac{1}{2} \cdot x \cdot \tan \frac{x}{2} - \frac{1}{2} \times 2 \int \tan \frac{x}{2} dx + \tan \frac{x}{2} + C \\ &= x \tan \frac{x}{2} + C \end{aligned}$$