

$$\begin{aligned}
& \int \sqrt{(x^2 + 2x)} \, dx \\
&= \int \sqrt{((x^2 + 2x + 1) - 1)} \, dx \\
&= \int \sqrt{((x + 1)^2 - 1)} \, dx \\
&= \int \sqrt{(u)^2 - 1} \, du \\
&= \int \sqrt{(\sec^2 \theta - 1)} (\sec \theta) (\tan \theta) \, d\theta \\
&= \int \sqrt{(\tan^2 \theta)} (\sec \theta) (\tan \theta) \, d\theta \\
&= \int (\tan \theta) (\sec \theta) (\tan \theta) \, d\theta \\
&= \int (\tan^2 \theta) (\sec \theta) \, d\theta \\
&= \int (\sec^2 \theta)
\end{aligned}$$