We consider $\mathbf{x}(t) = (\sqrt{1-t^2}, t)$ for $0 \leq t \leq 1$. Then $\mathbf{x}'(t) = (\frac{t}{\sqrt{1-t^2}}, 1)$ so

$$\|\mathbf{x}'(t)\| = \sqrt{\frac{t^2}{1-t^2} + 1} = \frac{1}{\sqrt{1-t^2}}.$$

Thus we have

$$\int_0^u \|\mathbf{x}'(t)\| \, dt = \theta$$

if $u = \sin\theta$. Then

$$\int_0^u \frac{1}{\sqrt{1-t^2}} dt = \arcsin(u).$$