$$\begin{aligned} L &= \int_a^b \sqrt{r^2 + (dr/d\theta)^2}\, d\theta = \int_0^{\pi/2} \sqrt{(4\sin\theta)^2 + (4\cos\theta)^2}\, d\theta \\ &= \int_0^{\pi/2} \sqrt{16(\sin^2\theta + \cos^2\theta)}\, d\theta \\ &= 4\int_0^{\pi/2} d\theta = 4\left[\theta\right]_0^{\pi/2} = 4\left(\tfrac{\pi}{2}\right) = 2\pi. \end{aligned}$$

As a check, note that the circumference of a circle with radius 2 is $2\pi\,(2) = 4\pi$, and since $\theta = 0$ to $\pi = \frac{\pi}{2}$ traces out $\frac{1}{2}$ of the circle (from $\theta = 0$ to $\theta = \pi$), $\frac{1}{2}(4\pi) = 2\pi$.