

$$\begin{aligned}\int_C x ds &= \int_0^\pi x \sqrt{1+\cos^2 x} dx = \frac{\pi}{2} \int_0^\pi \sqrt{1+\cos^2 x} dx = \frac{\pi}{2} \int_0^\pi \frac{1+\cos^2 x}{\sqrt{1+\cos^2 x}} dx \\ &\geq \frac{\pi}{2\sqrt{2}} \int_0^\pi (1+\cos^2 x) dx = \frac{3\sqrt{2}}{8} \pi^2 \quad (3 \text{ 分})\end{aligned}$$