We compute

$$\mathbf{R}'(t) = \cos t\mathbf{i} - \sin t\mathbf{j} + \mathbf{k},$$

so $\|\mathbf{R}'(t)\| = \sqrt{2}$. Then

$$\mathbf{T}(t) = \frac{1}{\sqrt{2}}(\cos t\mathbf{i} - \sin t\mathbf{j} + \mathbf{k}),$$

and

$$\mathbf{T}'(t) = -\frac{1}{\sqrt{2}}\sin t\mathbf{i} - \frac{1}{\sqrt{2}}\cos t\mathbf{j},$$

and $\|\mathbf{T}'(t)\| = 1/\sqrt{2}$. The curvature is therefore constant, and at every point, including the point $t = \pi$, is equal to

$$\kappa = \frac{\|\mathbf{T}'(t)\|}{\|\mathbf{R}'(t)\|} = \frac{1}{2}.$$

The length of the curve is

$$\int_0^{2\pi} \sqrt{(\cos t)^2 + (-\sin t)^2 + 1}dt = \int_0^{2\pi} \sqrt{1+1}dt = 2\pi\sqrt{2}.$$