I have two solutions for this problem an awesome solution and normal solution.

1 Solution 1(The Awesome One) :-

Now, let f be the 2π periodic function defined by

$$f(\theta) = \begin{cases} 0, & \text{if } \cos\theta\cos(\theta+\alpha) \geq 0 \\ 1, & \text{if } \cos\theta\cos(\theta+\alpha) < 0 \end{cases}$$

With this definition,

$$V_n(\alpha) = \left| \left\{ k \in \{1, \cdots, n\} : f(k\alpha) = 1 \right\} \right|$$