

$$\int_{\delta} (k - a)^n dz = \int_0^{2\pi} (a + ve^{it} - a) i v e^{it} dt =$$

$$= i v^{n+1} \int_0^{2\pi} (e^{it})^{n+1} dt = \begin{cases} 2\pi i & n = -1 \\ 0 & n \neq -1 \end{cases}$$

(n ≠ -1)

$$\frac{e^{i(n+1)t}}{i(n+1)} \Big|_{t=0}^{t=2\pi} = 0$$