

$$1) n \in \mathbb{Z} \setminus \{-1\}$$

$$\int (z-a)^n dz$$

$$\begin{cases} z-a=t \\ dz=dt \end{cases}$$

$$= \int t^n dt = \frac{t^{n+1}}{n+1}$$



$$= \frac{(z-a)^{n+1}}{n+1}$$

$$a-r$$

$$\int (z-a)^n dz = \frac{(z-a)^{n+1}}{n+1}$$

$$\frac{(z-a)^{n+1}}{n+1}$$

$$a-r$$



$$a+r$$

$$= \frac{(a-r-a)^{n+1} - (a+r-a)^{n+1}}{n+1} = \frac{(-r)^{n+1} - r^{n+1}}{n+1}$$

$$2) n = -1$$

$$\int_{\gamma} \frac{1}{z-a} dz = \int_0^{\pi} \frac{1}{re^{it}} i r e^{it} dt = \int_0^{\pi} i dt = \pi i$$