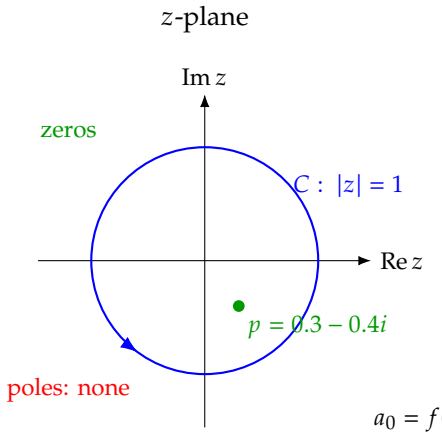

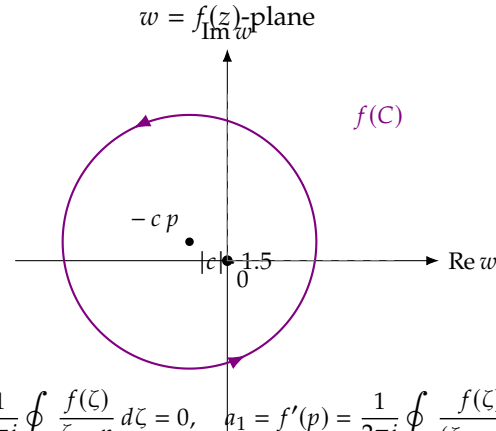

$$f(z) = c\,(z-p), \quad c = 1 + 0.5\,i, \qquad \operatorname{ord}_p f = \frac{1}{2\pi}\oint_C d\theta_{z-p} = \frac{1}{2\pi}\oint_C \operatorname{Im}\left(\frac{dz}{z-p}\right) = 1.$$

$$a_0 = f(p) = \frac{1}{2\pi i}\oint_C \frac{f(\zeta)}{\zeta - p}\,d\zeta = 0, \qquad a_1 = f'(p) = \frac{1}{2\pi i}\oint_C \frac{f(\zeta)}{(\zeta-p)^2}\,d\zeta = c.$$

$$\operatorname{wind}\big(f(C), 0\big) = 1 \;\Rightarrow\; \oint_C \frac{f'(z)}{f(z)}\,dz = 2\pi i.$$