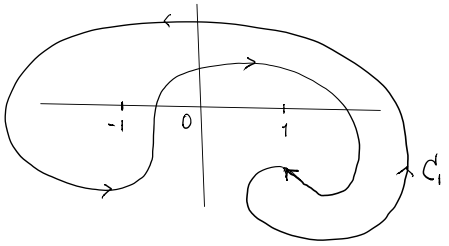
HW 3 Due Feb 23, 2017

1. Show that if C is a circle not passing through the point z_0, then

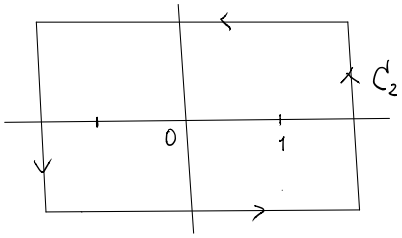
$$\int_C \frac{dz}{z - z_0} = \begin{cases} 2\pi i, & \text{if } z_0 \text{ lies inside } C \\ 0, & \text{if } z_0 \text{ lies outside } C. \end{cases}$$

2. Evaluate the following contour integrals by the principle of deformation of paths.

(a) $\int_{C_1} \frac{1}{z^2 - 1} dz$, where C_1 as in the following figure



(b) $\int_{C_2} \frac{3z - 2}{z^2 - z} dz$, where C_2 as in the following figure



(c) $\int_{C_3} \frac{2z^2 - z + 1}{(z-1)^2(z+1)} dz$, where C_3 as in the following figure