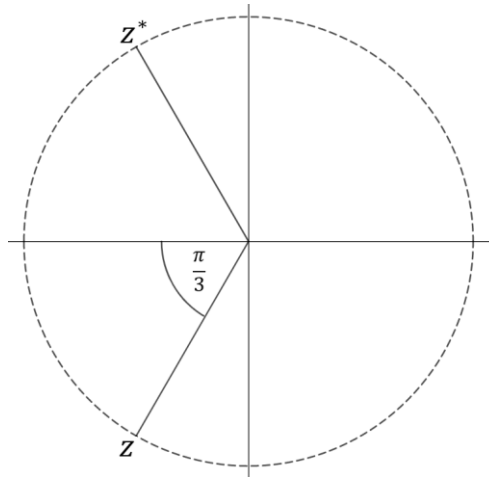


Pure Core 1 Complex Numbers

$$z = -1 - \sqrt{3}i$$

Find $|z|$, $\left|\frac{z}{z^*}\right|$, $\arg z$, $\arg z^*$ and $\arg \frac{z}{z^*}$

Visualise the problem or make a sketch.



$$|z| = \sqrt{1+3} = 2$$

$$\left|\frac{z}{z^*}\right| = 1$$

$$\arg z = -\pi + \arctan \sqrt{3} = -\frac{2\pi}{3}$$

$$\arg z^* = \frac{2\pi}{3}$$

$$\arg \frac{z}{z^*} = \arg z - \arg z^* = -\frac{2\pi}{3} - \frac{2\pi}{3} + 2\pi = \frac{2\pi}{3}$$