

3.59  
15

$$2 < |z-1| < 4$$

$$2 < |x+iy-1| < 4$$

$$4 < x^2+(y-1)^2 < 16$$

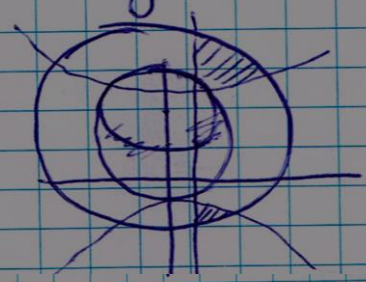
$$\operatorname{Re}(z+i) \geq 1$$

$$x \geq 1$$

$$\operatorname{Re}[(\bar{z})^2] < -1$$

$$\operatorname{Re}(x^2-2xy+iy^2) < -1$$

$$x^2-y^2 < -1$$



3.59  
16

$$z^4 + 1 + \cos\frac{\pi}{3} + i\sin\frac{\pi}{3} = 0$$

$$z^4 = -1 - \frac{1}{2} - \frac{\sqrt{3}}{2}i = -\frac{3}{2} - \frac{\sqrt{3}}{2}i = \sqrt{3} \operatorname{cis} 210^\circ$$

$$z_k = \sqrt[4]{3} \operatorname{cis}\left(\frac{210^\circ}{4} + \frac{2\pi}{4}k\right) \quad k=0,1,2,3$$