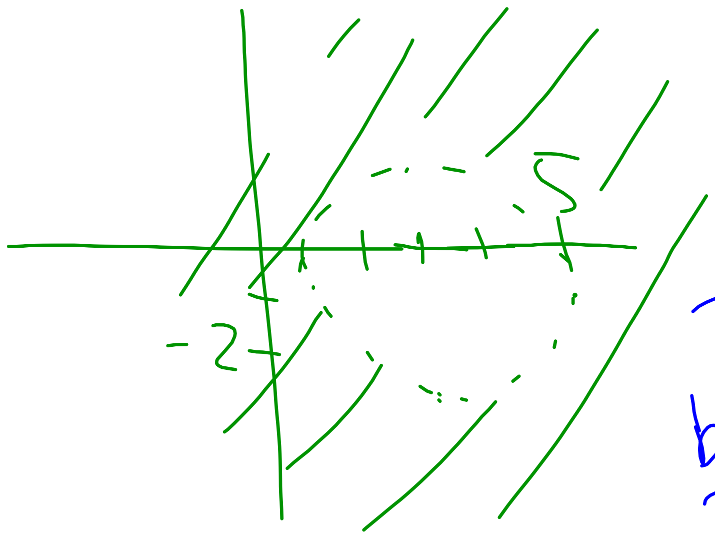
Sketch the region $\{z : |z-3+i| > 2\}$




$|z-(3-i)|$

The distance between $z$ and $3-i$

(B pg 25, #1 b)

$$|2z+3|>4$$

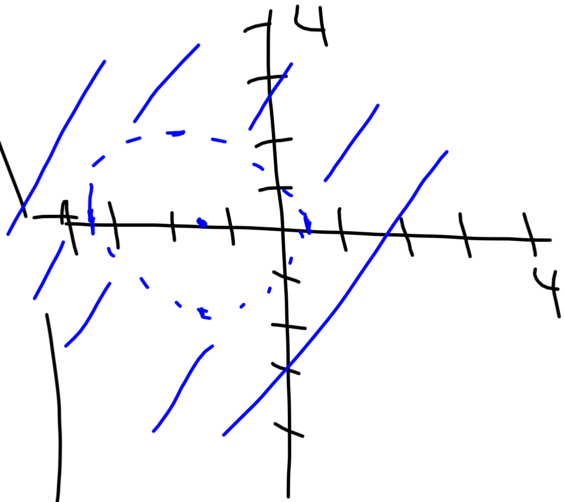
$$\left|2\left(z+\tfrac{3}{2}\right)\right|>4$$

$$|2|\left|z+\tfrac{3}{2}\right|>4$$

$$2\left|z+\tfrac{3}{2}\right|>4$$

$$\left|z+\tfrac{3}{2}\right|>2$$

$$\left|z-\left(-\tfrac{3}{2}\right)\right|>2$$



$$\mathrm{Re}\left(\frac{1}{z}\right) \le \frac{1}{2} \qquad z \neq 0$$

$$\frac{1}{z} = \frac{1}{x+iy} = \frac{1}{x+iy} \cdot \frac{x-iy}{x-iy}$$

$$= \frac{x-iy}{x^2+y^2} \qquad z\bar{z} = |z|^2$$

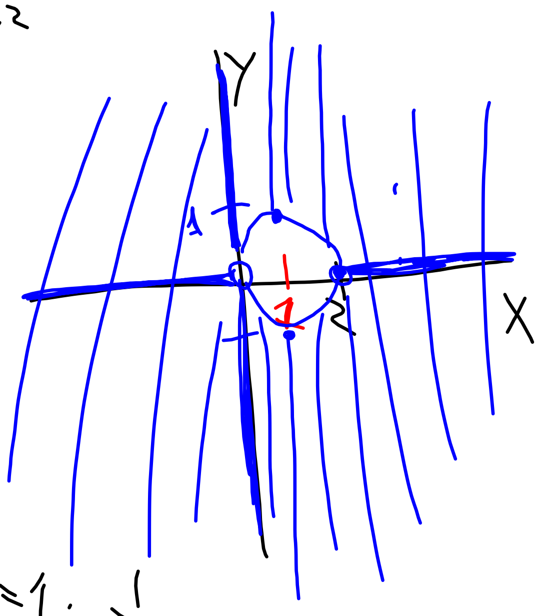
$$\mathrm{Re}\left(\frac{1}{z}\right) = \frac{x}{x^2+y^2} \le \frac{1}{2}$$

When z is real ($y=0$)

$$\frac{1}{x} \le \frac{1}{2}$$

$x>0$ → $1 \le \frac{1}{2}x$, $2 \le x$

$x<0$ → $1 \ge \frac{1}{2}x$, $2 \ge x$




$x=1$: $\frac{1}{1+y^2} \le \frac{1}{2}$

$$\frac{x}{x^2+y^2} \le \frac{1}{2} \quad (\text{not both } x=0,\ y=0) \qquad x^2+y^2=4$$

$$\frac{2x}{x^2+y^2} \le 1$$

$x^2+y^2>0$

$$2x \le x^2+y^2$$

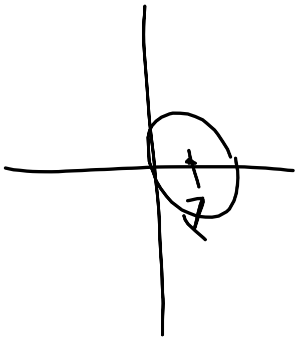
$$0 \le x^2-2x+y^2$$

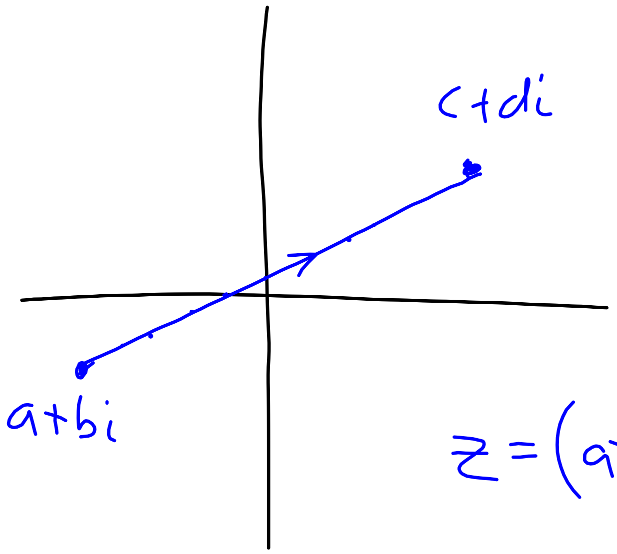
$$2\,\mathrm{Re}(z) \le |z|^2$$

$$1 \le x^2-2x+1+y^2$$

$$1 \le (x-1)^2+y^2$$

$$(x-1)^2+y^2=1:$$






$$z = \big(a + (c-a)t\big) + \big(b + (d-b)t\big)i$$

$$0 \le t \le 1$$

$$\frac{1}{1-x} = \underbrace{1 + x + x^2 + x^3 + x^4 + \cdots}_{\text{Power Series}}$$

$$\lim_{x \to 1^-} \frac{1}{1-x} = \infty$$

$$\lim_{x \to 1^+} \frac{1}{1-x} = -\infty$$

Due Fri at 3:00 PM

CB pgs 66 + 67

\# 3(b), 6, 11

see 1/22 notes