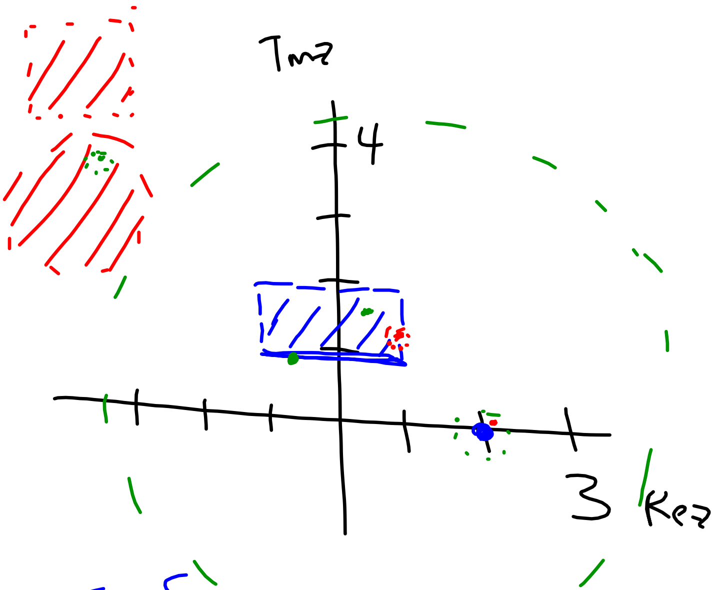
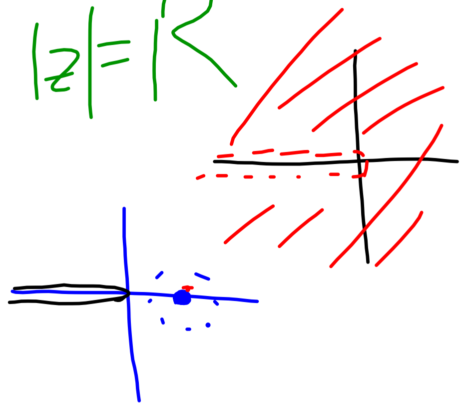
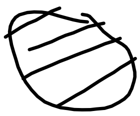


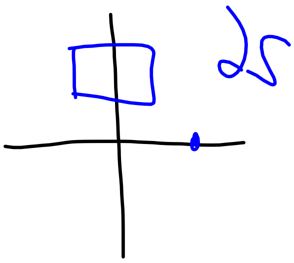
$|z| = R$

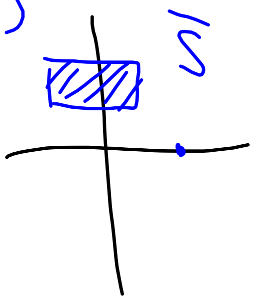


$$S = \{ z \in \mathbb{C} : -1 < \operatorname{Re} z < 1, \ 1 \le \operatorname{Im} z < 2 \} \cup \{ 2 \}$$

$|\operatorname{Re} z| < 1$







$$
\begin{array}{r}
2x^2 + 5x - 3 \\
x - 1 \overline{\big)\, 2x^3 + 3x^2 - 8x + 3} \\
\underline{2x^3 - 2x^2 } \\
5x^2 - 8x \\
\underline{5x^2 - 5x } \\
-3x + 3 \\
\underline{-3x + 3} \\
0
\end{array}
$$

Complex functions

Real
$y = f(x)$

$f: \mathbb{C} \to \mathbb{C}$

$w = f(z) = u + iv$

$z = x + iy \longleftrightarrow x$
$w = u + iv \longleftrightarrow y$

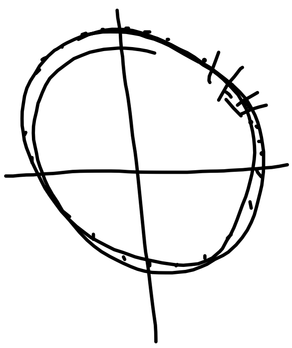
$f(z) = f(x, y) = u(x, y) + iv(x, y)$

z plane w plane

$f(z)=z^2$ What are u and v?

$f(z)=f(x,y)=(x+iy)^2$

Office Tues
10-11
12-3 or later



$=(x+iy)(x+iy)$

$=\underbrace{x^2-y^2}_{u(x,y)}+\underbrace{2xy}_{v(x,y)}i$

A set S is <u>bounded</u> if every point in S lies inside some circle $|z|=R$.

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

$$z=x+iy \qquad \frac{2x}{x^2+y^2}\le 1$$

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

$$\frac{x}{x^2+y^2}-i\frac{y}{x^2+y^2}$$