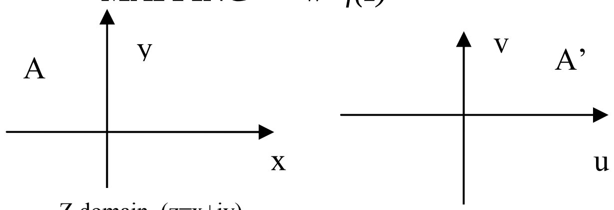
MAPPING *w=f(z)*



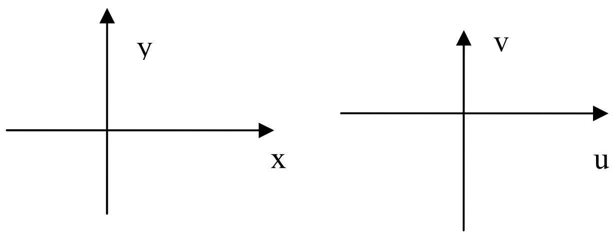
Z domain, (z=x+iy)   w=f(z) domain, (w=u+iv)

f: defines a mapping of z domain into w domain .
The image of A is A'.

-

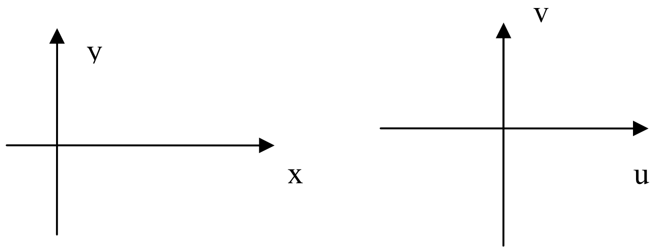
Mapping of $w=f(z)=z^2$

A=1 $A'=1^2=1$
B=-3 $B'=(-3)^2=9$
C=2+3i $C'=(2+3i)^2= - 5 + 12i$
D=-3+i $D'=(-3+i)^2=8-6i$



mapping of x=2 line

A=2+4i A'=$(2+4i)^2$=-12+16i
B=2+3i B'=-5+12i
C=2+2i C'=8i
D=2+i D'=3+4i
E=2 E'=4
F=2-i F'=3-4i
G=2-2i G'=-8i



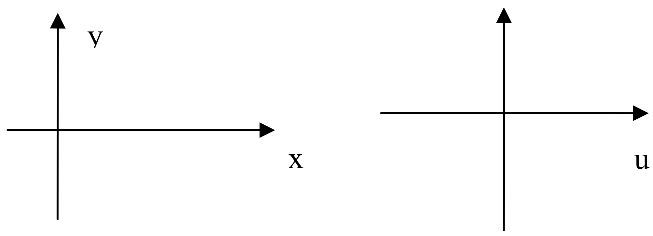
General Formula for mapping of x=2 line

$w=f(z)=z^2=(x+iy)^2 = (2+iy)^2=4-y^2 +4yi=u+iv$

$u=4-y^2$, $v=4y$

$v=4y \rightarrow y=\frac{v}{4}$

$u=4-y^2 = 4-\left(\frac{v}{4}\right)^2 =4- 0.0625 v^2=-0.0625 v^2 +4$ (parabola)



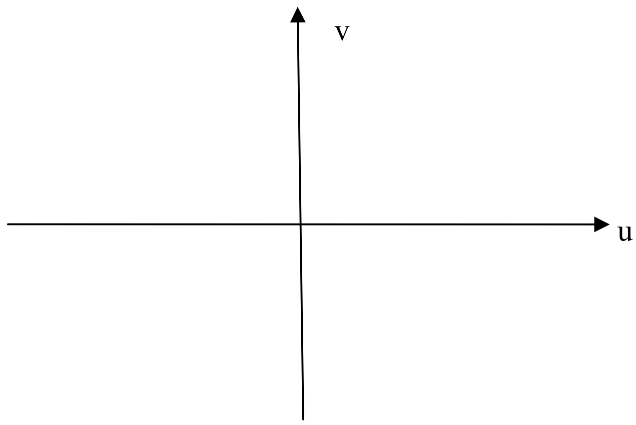
General Formula for mapping of x=a line

$w=f(z)=z^2=(x+iy)^2 = (a+iy)^2=a^2-y^2 +2ayi=u+iv$

$u=a^2-y^2$, $v=2ay$

$v=2ay \rightarrow y=\frac{v}{2a}$

$u= a^2 -y^2 = a^2-\left(\frac{v}{2a}\right)^2 = -\frac{1}{4a^2} v^2 +a^2$



General Formula for mapping of y=b line

$w=f(z)=z^2=(x+iy)^2 = (x+ib)^2=x^2-b^2 +2xbi=u+iv$

$u=x^2-b^2$, $v=2bx$

$v=2bx \rightarrow x=\frac{v}{2b}$

$u= x^2 -b^2 = \left(\frac{v}{2b}\right)^2 -b^2= \frac{1}{4b^2} v^2 - b^2$