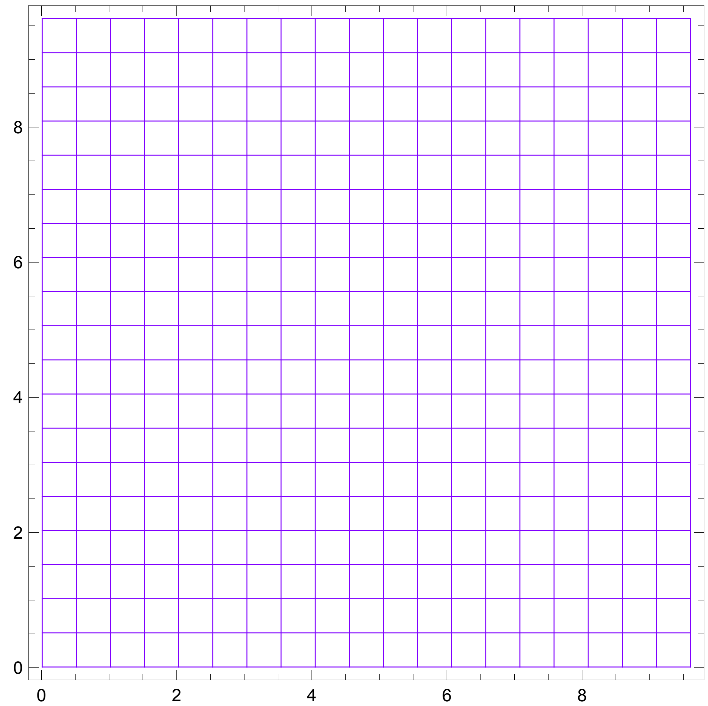
Gauss Plane and Complex Function

Graphics primitives

```
b[x__]:=Map[{Re[#],Im[#]}&,x,{2}]

bl[x__]:=Map[Line,b[x]]

c[x__]:=Map[{Re[#],Im[#]}&,Transpose[x],{2}]

cl[x__]:=Map[Line,c[x]]

a = Table[N[i/10] + I N[j/10], (*I = Sqrt[-1]*){j,0.1,101,10.1/2},{i,0.1,101,10.1/2}];

plt[clr_,x__]:=Show[Graphics[{Hue[clr],bl[x]}],Graphics[{Hue[clr],cl[x]}],
AspectRatio->Automatic,Frame->True]

plt[.75,a]
```

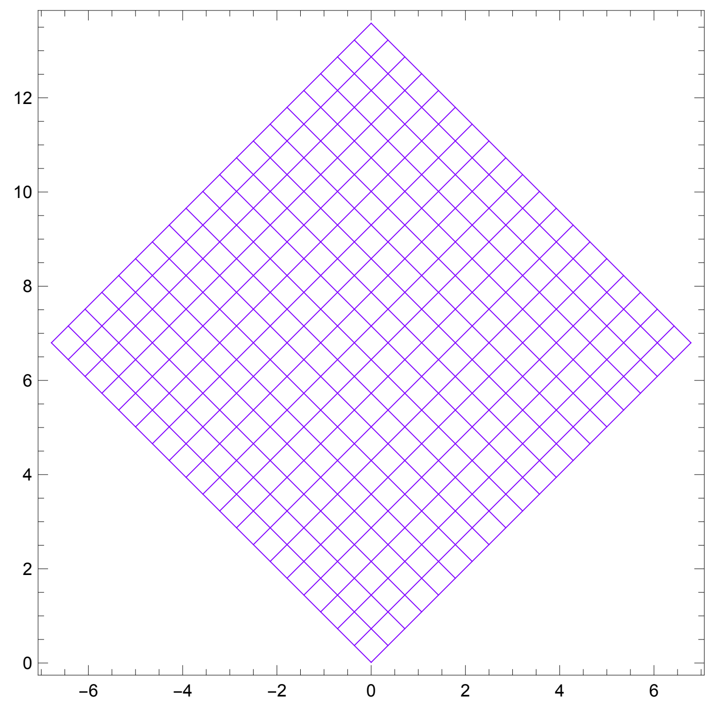


$r = \mathrm{Exp}[I\mathrm{Pi} * .25]$ (*$I = \mathrm{Sqrt}[-1]$*)

$0.707107 + 0.707107i$

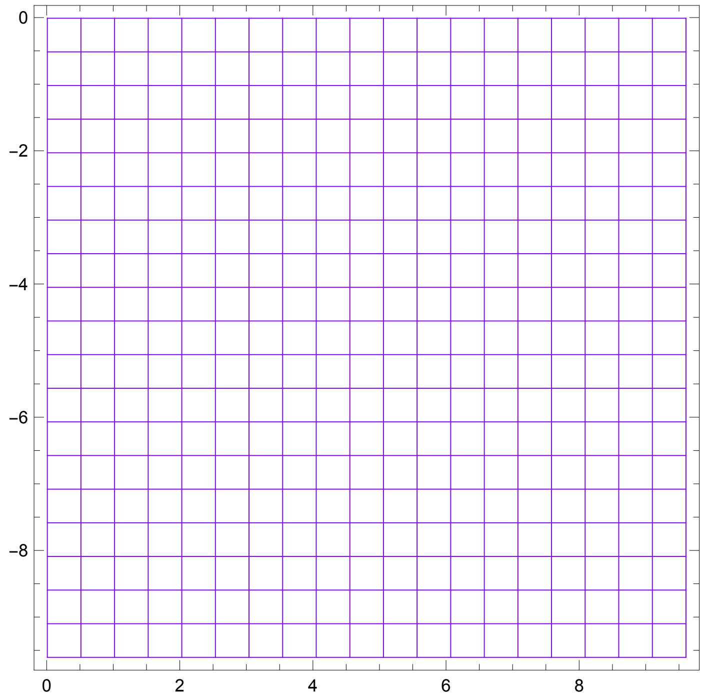
plt[.75, $r * a$]

(*RotateofAngle = Pi/4aroundzero.$r$actstoeachelementof$a$*)



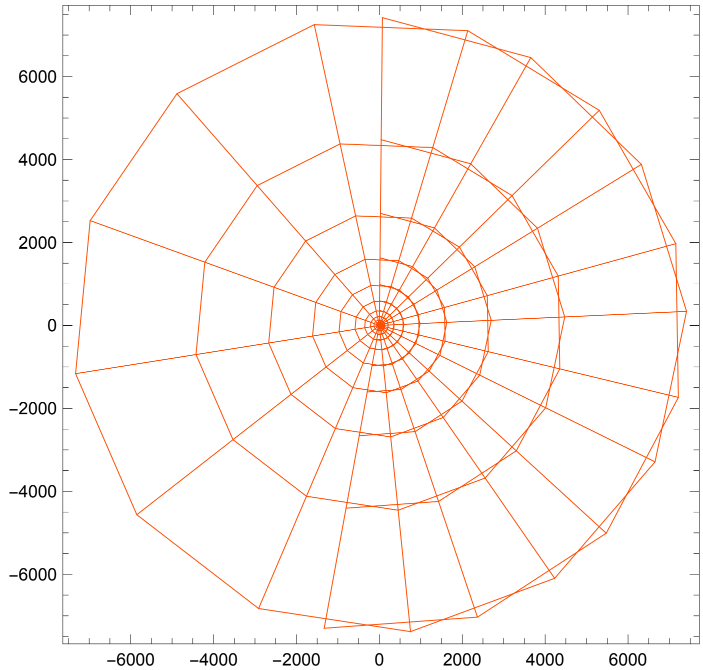
plt[.75, Conjugate[*a*]]

(*Conjugate acts to each element of a*)

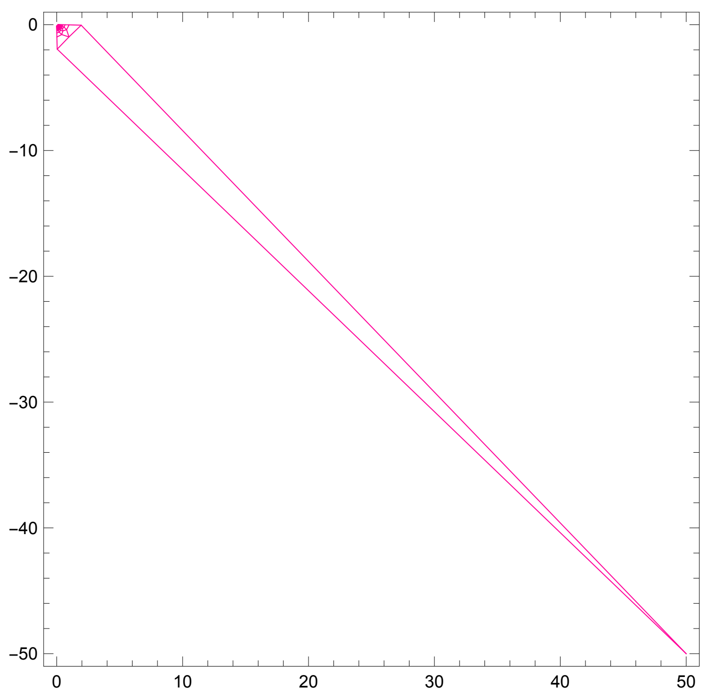


Function acts to each element of List .

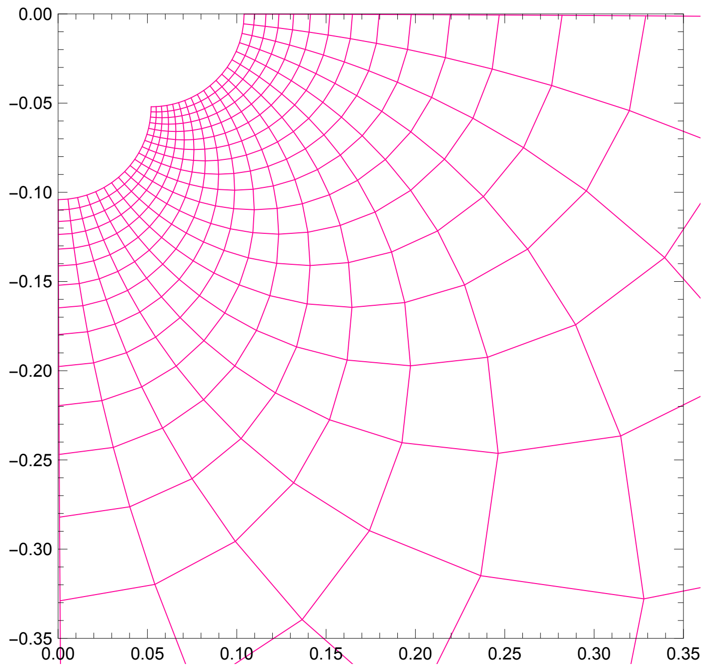
plt[.05, Sin[*a*]]   (*sine function*)



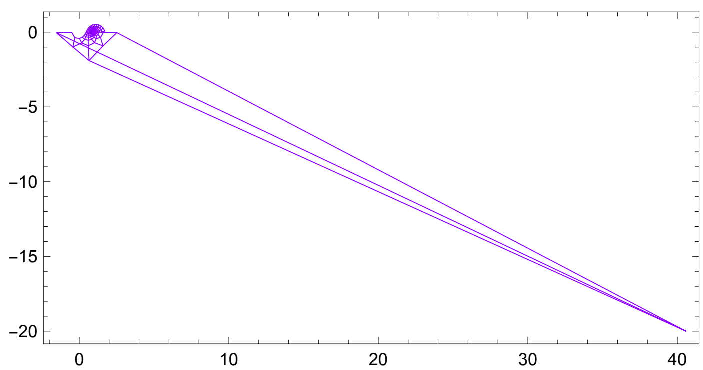
$\mathbf{g1 = plt[.9, 1/}a\mathbf{]}$ $\mathbf{(*1/}a\mathbf{isinverseofeachelementof}a\mathbf{*)}$



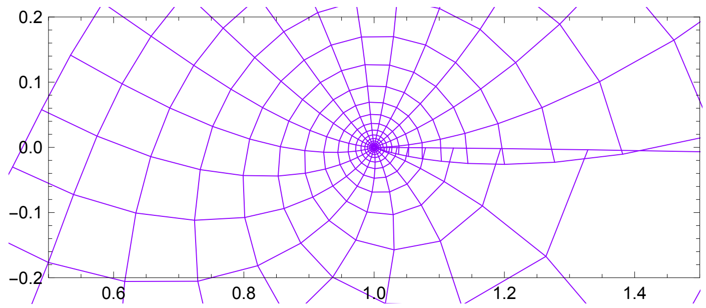
Show[g1, PlotRange->{{0, 0.35}, {−0.35, 0}}]



g2 = plt[.76, Zeta[a]]   (*Riemann′sZetafunction*)



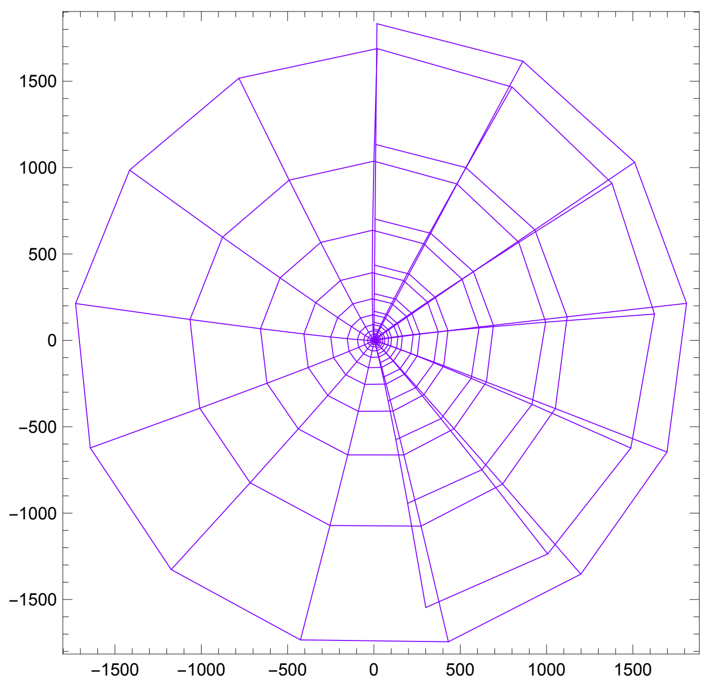
Show[g2, PlotRange->{{0.5, 1.5}, {−0.2, 0.2}}]



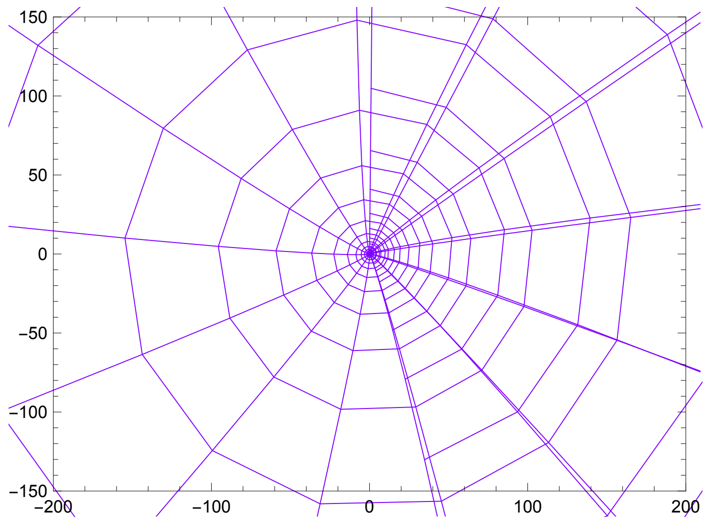
?BesselJ

□

g3 = plt[.75, BesselJ[1, a]]

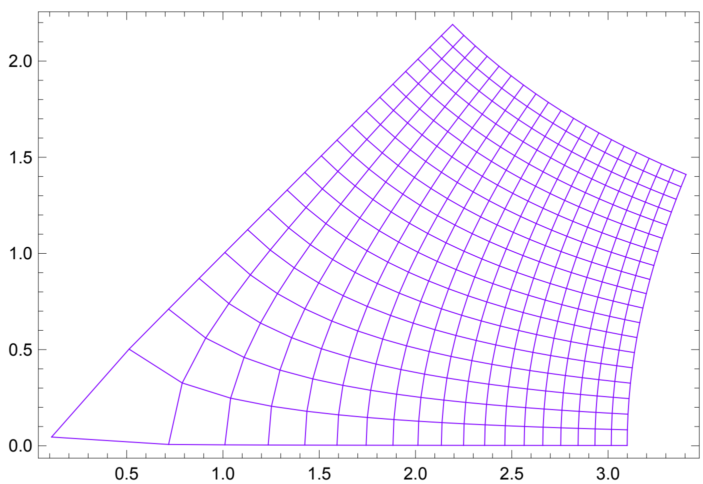


Show[g3, PlotRange->{{−200, 200}, {−0150, 150}}]

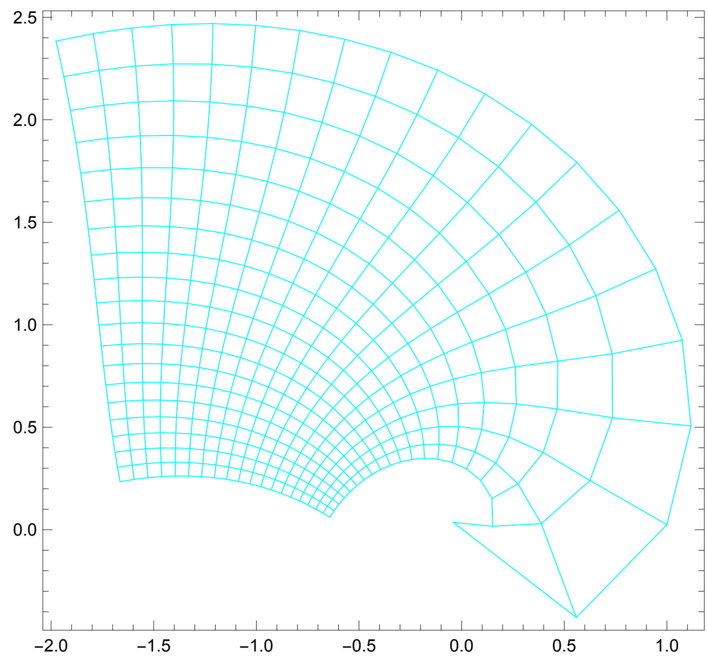


plt[.75, Sqrt[a]]

(*Square Root of each element of a*)



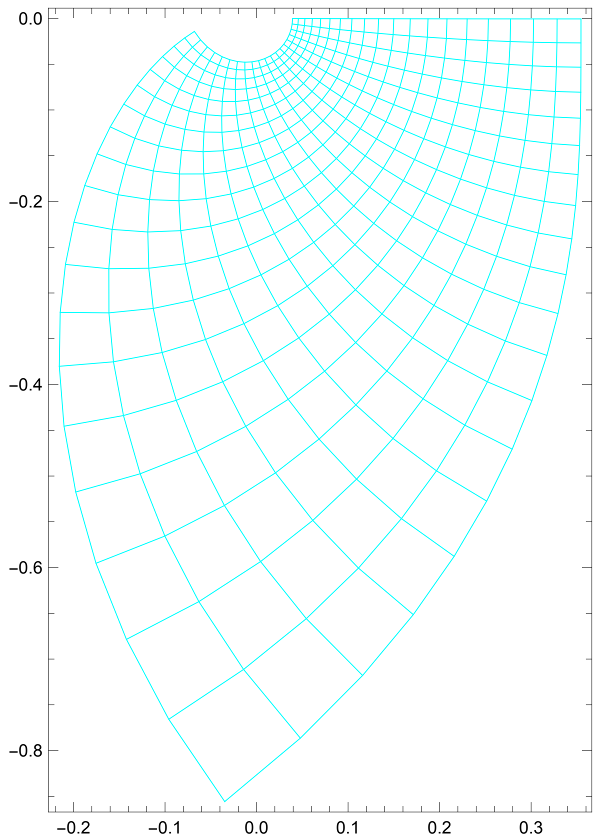
plt[.5, a^(.5 + I)]   (*Power by "1/2 + Sqrt[-1]"*)



?AiryAi

□

plt[.5, AiryAi[Evaluate[*a*/5]]]



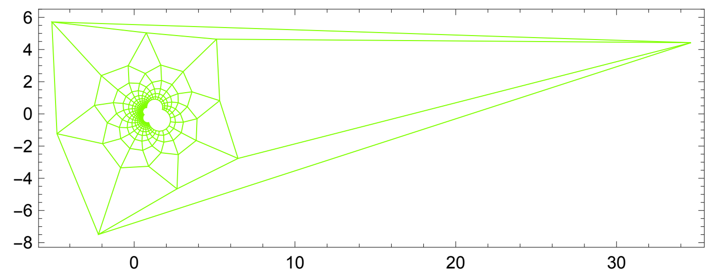
$\mathbf{a1 = 4 + 4}\boldsymbol{I}$

$4 + 4i$

$\mathbf{a2 = 6 + 7}\boldsymbol{I}$

$6 + 7i$

$\mathbf{plt[.25, (}\boldsymbol{a}\mathbf{ - a1)/(}\boldsymbol{a}\mathbf{ - a2)]}$


6
4
2
0
−2
−4
−6
−8
0
10
20
30