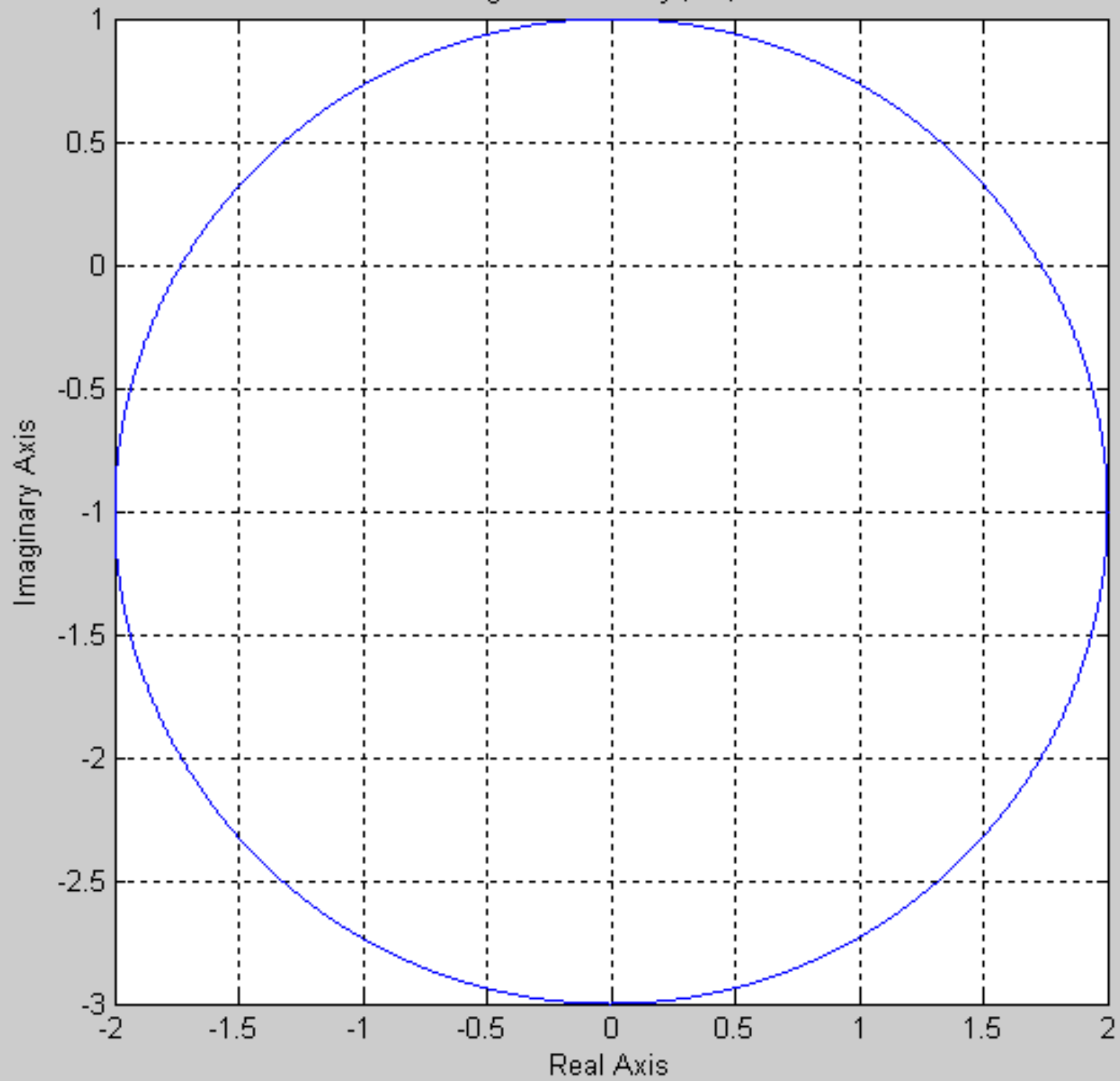


1)

```
function plot1
theta=0:pi/10000:2*pi;
x=2*cos(theta);
y=2*sin(theta)-1;
plot(x,y)
title('Region defined by  $|z+i|=2$ ');
xlabel('Real Axis')
ylabel('Imaginary Axis')
grid on;
```

Region defined by $|z+i|=2$



2) In the command window,

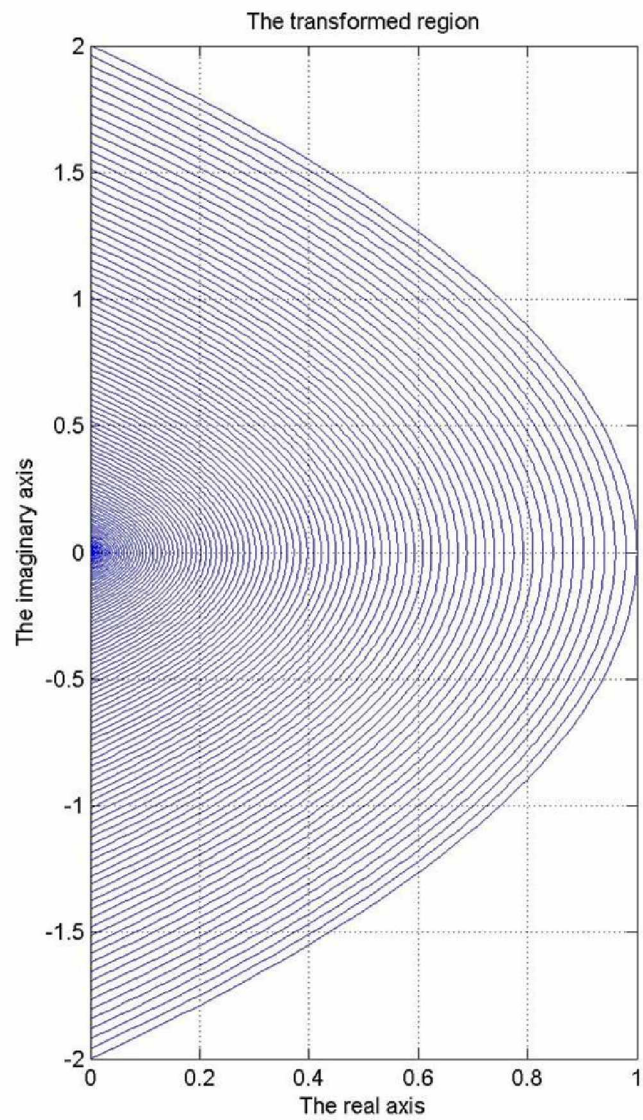
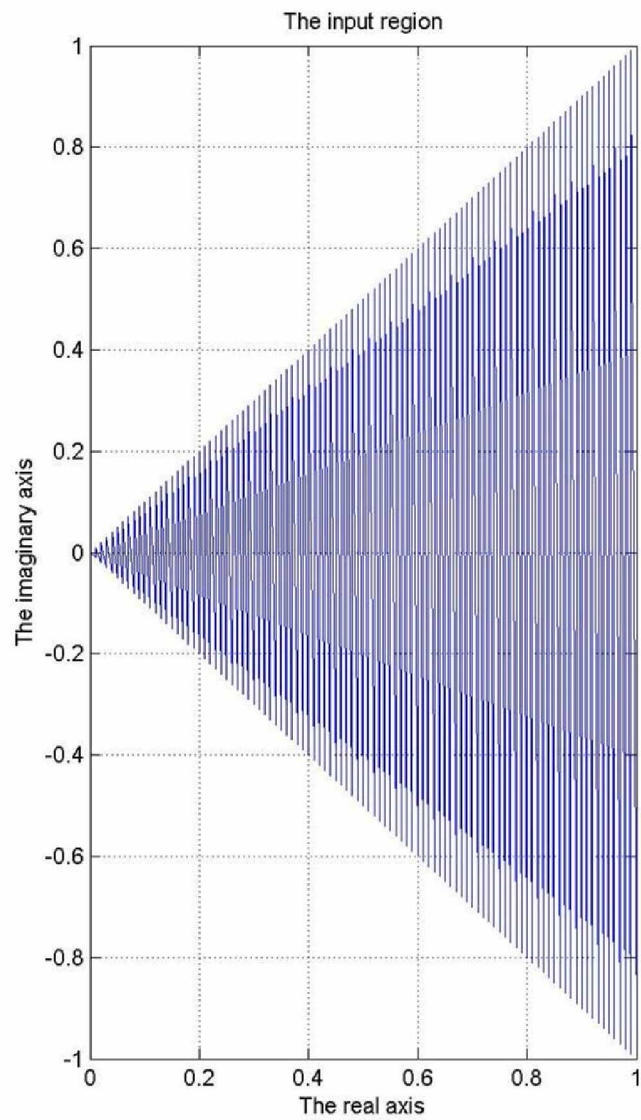
```
>> proots=roots([1 0 -1 0 0 2])
```

```
proots =
```

```
-1.09868411346781 + 0.45508986056223i  
-1.09868411346781 - 0.45508986056223i  
1.09868411346781 + 0.45508986056223i  
1.09868411346781 - 0.45508986056223i  
0 + 1.000000000000000i  
0 - 1.000000000000000i
```

3)

```
function mymap
l=0;
for x=0:0.01:1,
    for y=-x:0.01:x,
        l=l+1;
        z(l)=x+i*y;
    end
end
w=z.^2;
subplot(1,2,1)
plot(z)
grid on;
xlabel('The real axis');
ylabel('The imaginary axis');
title('The input region');
subplot(1,2,2)
plot(w)
grid on;
xlabel('The real axis');
ylabel('The imaginary axis');
title('The transformed region');
```



4)

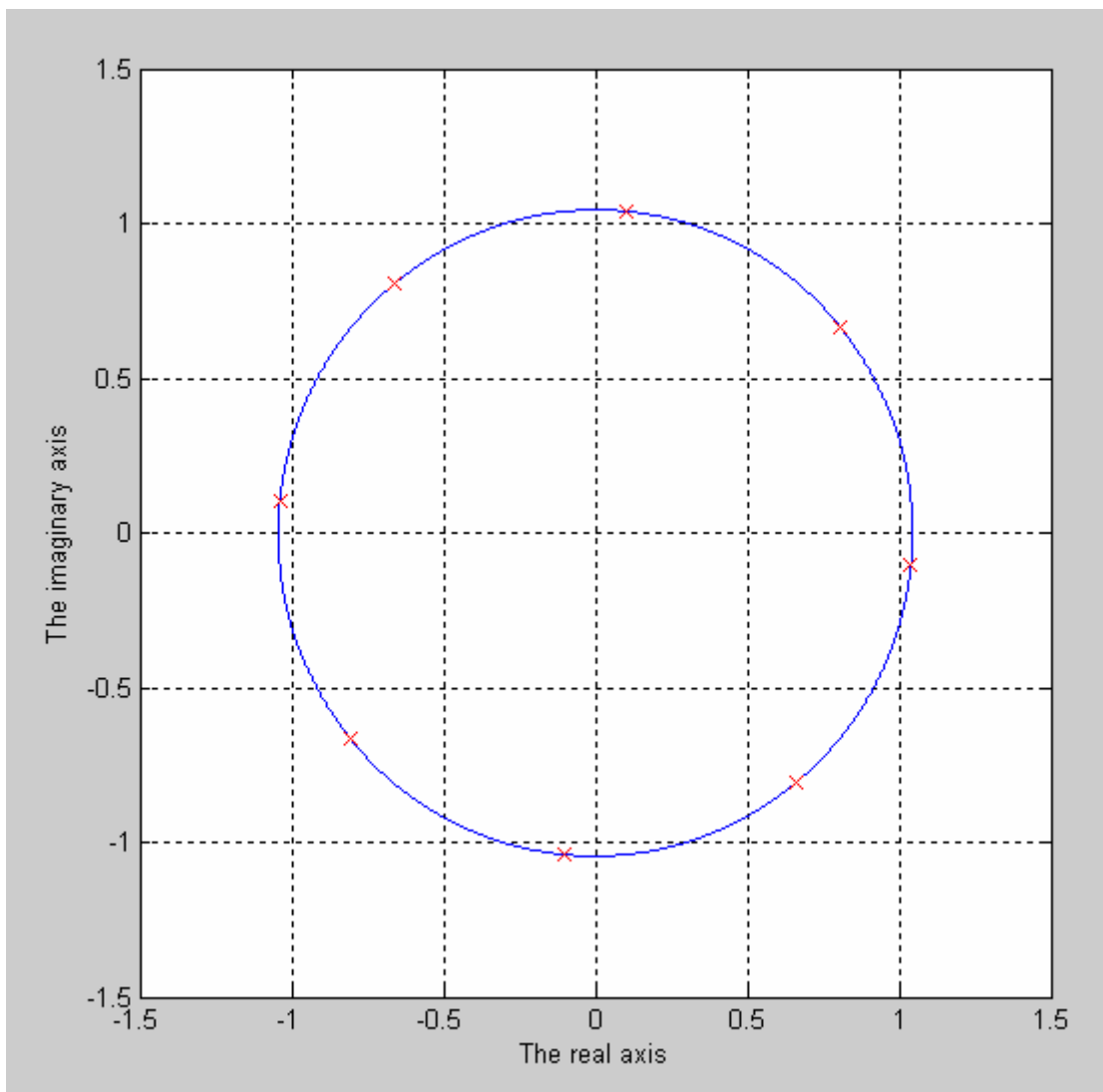
```
function roots = rootplot(r0,ph0,n)
z0 = r0*exp(i*ph0);
roots = zeros(1,n);
for k = 0:n-1,
roots(k+1) = (r0^(1/n))*exp(i*(ph0+2*pi*k)/n);
end
roots = (roots)';
theta = -pi:pi/10000:pi;
x = (r0^(1/n))*cos(theta);
y = (r0^(1/n))*sin(theta);
figure;
plot(x,y);
hold on;
plot(roots,'rx','MarkerSize',7);
grid on;
hold off;
xlabel('The real axis');
ylabel('The imaginary axis');
```

a) In the Matlab command window;

```
>> rootsa = rootplot(sqrt(2),pi/4,8)
```

rootsa =

```
1.03924531873597 - 0.10235672987467i  
0.66248027440012 - 0.80723454998904i  
-0.10235672987467 - 1.03924531873597i  
-0.80723454998904 - 0.66248027440012i  
-1.03924531873597 + 0.10235672987467i  
-0.66248027440012 + 0.80723454998903i  
0.10235672987467 + 1.03924531873597i  
0.80723454998903 + 0.66248027440012i
```

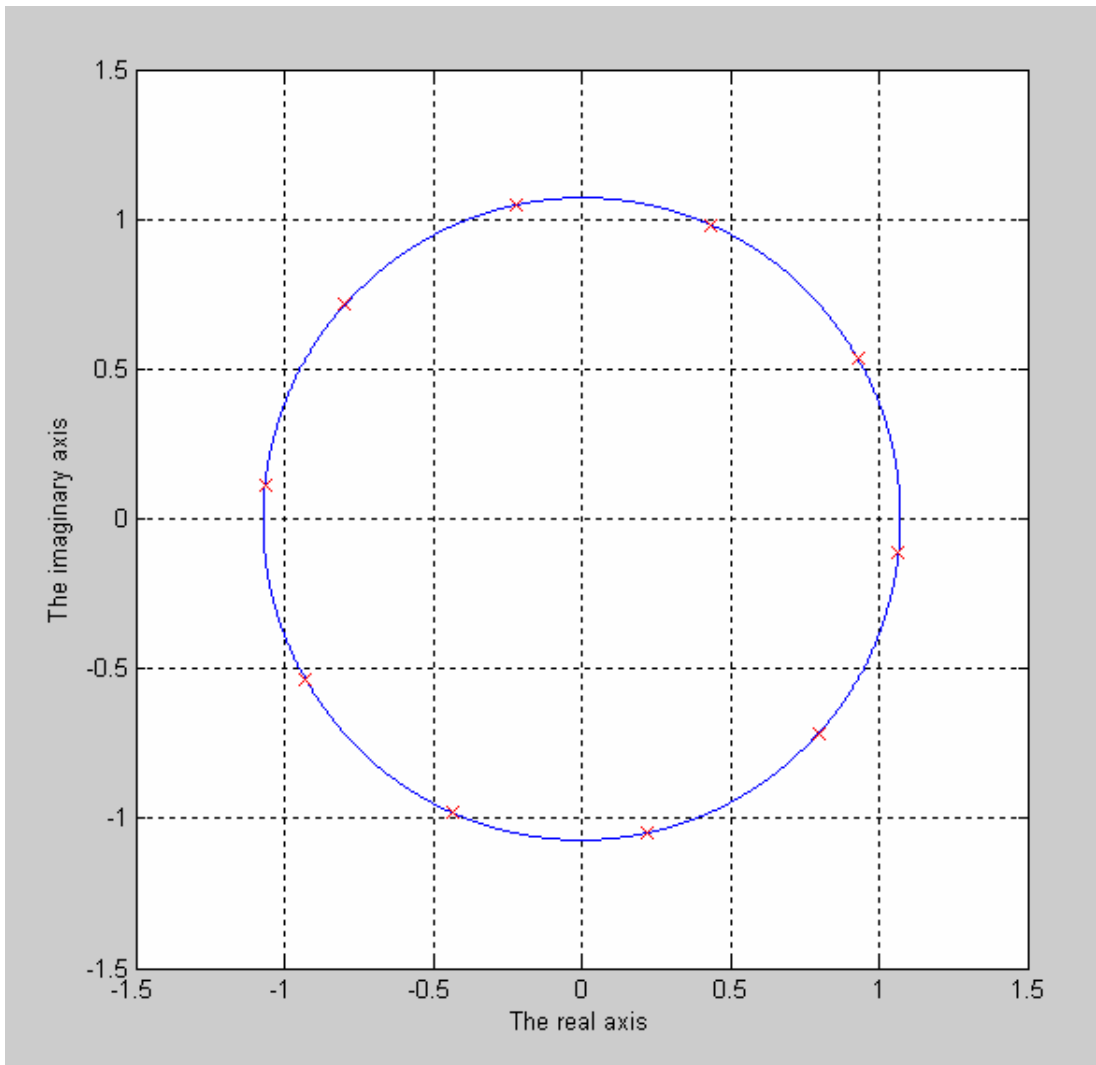


b) In the Matlab command window;

```
>> rootsb = rootplot(2,pi/3,10)
```

rootsb =

```
1.06590217536701 - 0.11203083300997i  
0.79648290276784 - 0.71715642686624i  
0.22283423276953 - 1.04835264091004i  
-0.43592954028974 - 0.97911377832191i  
-0.92818304565844 - 0.53588673126815i  
-1.06590217536701 + 0.11203083300997i  
-0.79648290276784 + 0.71715642686624i  
-0.22283423276953 + 1.04835264091004i  
0.43592954028974 + 0.97911377832191i  
0.92818304565844 + 0.53588673126815i
```

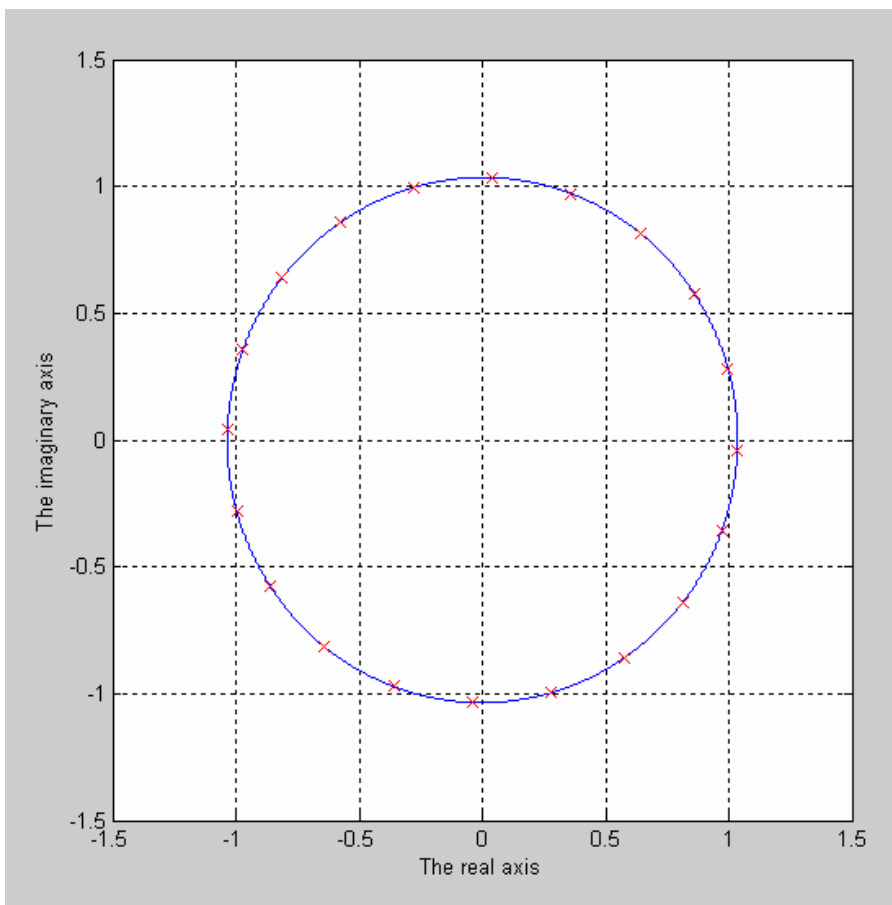


c) In the Matlab command window;

```
>> rootsc = rootplot(2,pi/4,20)
```

rootsc =

```
1.03446677210385 - 0.04064431017184i  
0.97127658193243 - 0.35832284873553i  
0.81301107263960 - 0.64092625028290i  
0.57516237497557 - 0.86079132485681i  
0.28101277665704 - 0.99639614706792i  
-0.04064431017184 - 1.03446677210385i  
-0.35832284873553 - 0.97127658193243i  
-0.64092625028290 - 0.81301107263960i  
-0.86079132485681 - 0.57516237497558i  
-0.99639614706792 - 0.28101277665704i  
-1.03446677210385 + 0.04064431017184i  
-0.97127658193243 + 0.35832284873553i  
-0.81301107263960 + 0.64092625028290i  
-0.57516237497557 + 0.86079132485681i  
-0.28101277665704 + 0.99639614706792i  
0.04064431017184 + 1.03446677210385i  
0.35832284873553 + 0.97127658193243i  
0.64092625028290 + 0.81301107263960i  
0.86079132485681 + 0.57516237497557i  
0.99639614706792 + 0.28101277665704i
```



d) In the Matlab command window;

```
>> rootsd = rootplot(sqrt(10),atan(3),15)
```

rootsd =

```
1.07603382757249 - 0.08980870280504i  
0.94647732515072 - 0.51970671936716i  
0.65326629473382 - 0.85974272276337i  
0.24709958721948 - 1.05112139887636i  
-0.20179288375440 - 1.06075163598550i  
-0.61579353189634 - 0.88696827860666i  
-0.92331788406479 - 0.55982004800289i  
-1.07119218599879 - 0.13587384529394i  
-1.03384762749810 + 0.31156617964147i  
-0.81774142199215 + 0.70513358162698i  
-0.46024029567616 + 0.97677698141170i  
-0.02315944108593 + 1.07952676737004i  
0.41792589126497 + 0.99561656805731i  
0.78674804027863 + 0.73955521923489i  
1.01953430574655 + 0.35561805435852i
```

