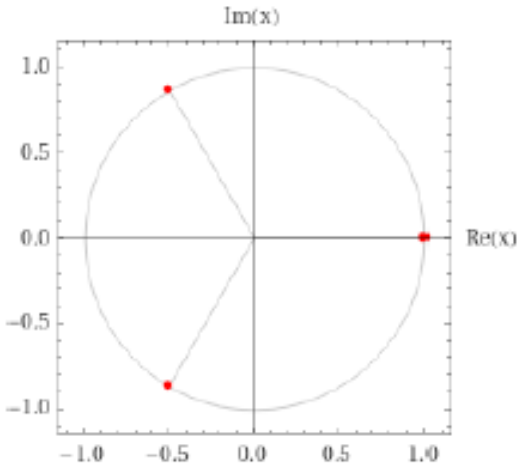
MATLAB CODE:

1. MATLAB code for the function

$$f(z) = z^3 - 1$$

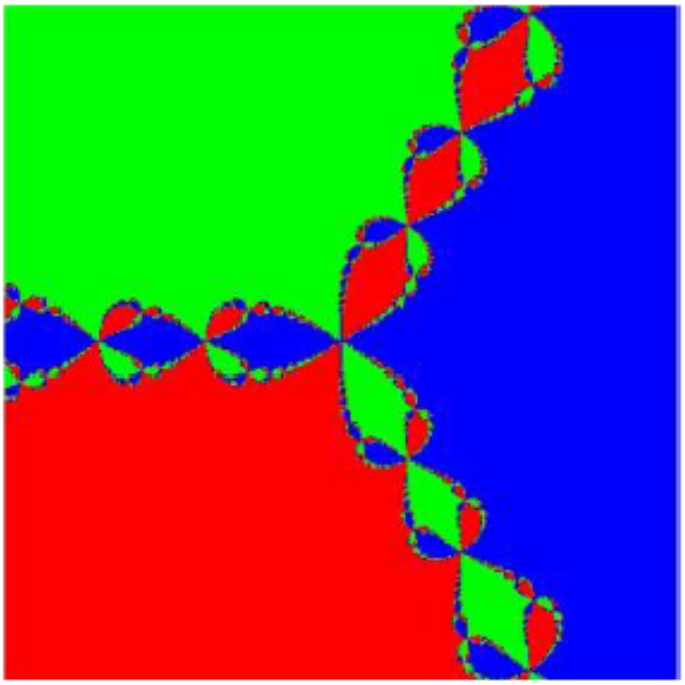


The complex roots of this function are:

```
-0.5000 + 0.8660i
-0.5000 - 0.8660i
 1.0000 + 0.0000i
```

```
clc;
x=-2:.01:2;
x=x+eps;
y=x;
i=complex(0,1);
[X Y]=meshgrid(x,y);
Z=X+i*Y;
for j=1:64
    Z=Z-(Z.^3-1)./(3*Z.^2);
end
% coefficents of x^3-1 in order are 1 0 0 -1
 r=roots([1 0 0 -1]);
 Z1=abs(Z-r(1))<=0.1;
 Z2=abs(Z-r(2))<=0.1;
 Z3=abs(Z-r(3))<=0.1;
 a(:,:,1) = Z1*1;
 a(:,:,2) = Z2*1;
 a(:,:,3) = Z3*1;
figure
imshow(a)
```

Output:

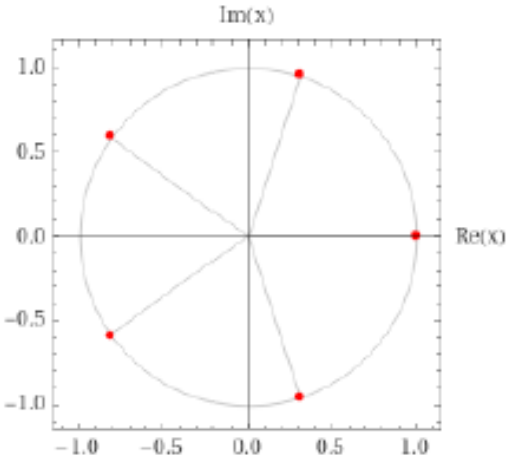


2. MATLAB code for the function

$$f(z) = z^5 - 1$$

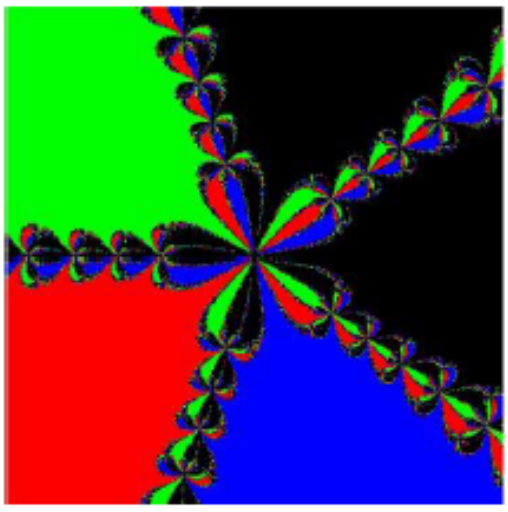
The complex roots of this function are:

```
-0.8090 + 0.5878i
-0.8090 - 0.5878i
 0.3090 + 0.9511i
 0.3090 - 0.9511i
 1.0000 + 0.0000i
```




```
x=-2:.01:2;
x=x+eps;
y=x;
i=complex(0,1);
[X Y]=meshgrid(x,y);
Z=X+i*Y;
for j=1:64
    Z=Z-(Z.^5-1)./(5*Z.^4);
end
% imshow(Z);
% coefficents of x^5-1 in order are 1 0 0 0 0 -1
r=roots([1 0 0 0 0 -1]);
 Z1=abs(Z-r(1))<=0.1;
 Z2=abs(Z-r(2))<=0.1;
 Z3=abs(Z-r(3))<=0.1;
 a(:,:,1) = Z1*1;
a(:,:,2) = Z2*1;
a(:,:,3) = Z3*1;
figure
imshow(a)
```

Output:

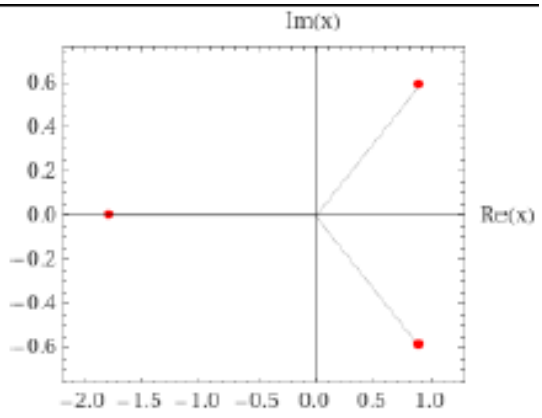


3. MATLAB code for the function

$$f(z) = z^3 - 2z + 2$$

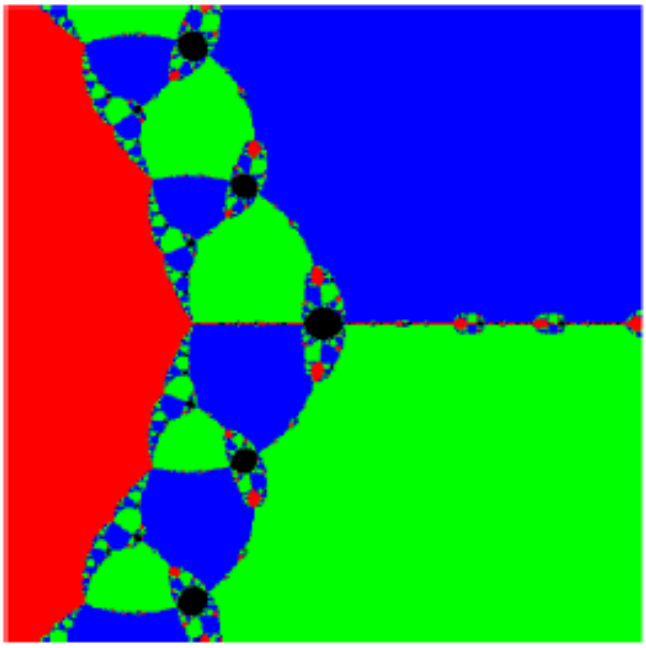
The complex roots of this function are:

$$-1.7693 + 0.0000i$$
$$0.8846 + 0.5897i$$
$$0.8846 - 0.5897i$$




```
clear all;clc;
x=-2:.01:2;
x=x+eps;
y=x;
i=complex(0,1);
[X Y]=meshgrid(x,y);
Z=X+i*Y;
for j=1:64
    Z=Z-(Z.^3-2*Z+2)./(3*Z.^2-2);
end
% imshow(Z);
r=roots([1 0 -2 2]);
 Z1=abs(Z-r(1))<=0.1;
 Z2=abs(Z-r(2))<=0.1;
 Z3=abs(Z-r(3))<=0.1;
 a(:,:,1) = Z1*1;
a(:,:,2) = Z2*1;
a(:,:,3) = Z3*1;
figure
imshow(a)
```

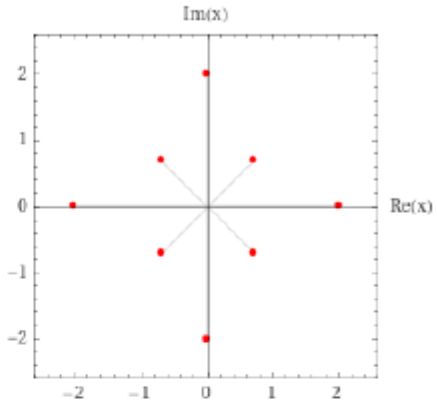
Output:



4. MATLAB code for the function $f(z) = z^8 - 15z^4 - 16$

The complex roots of this function are:

```
-1.4142 + 1.4142i
-1.4142 - 1.4142i
 1.4142 + 1.4142i
 1.4142 - 1.4142i
-1.0000 + 0.0000i
 0.0000 + 1.0000i
 0.0000 - 1.0000i
 1.0000 + 0.0000i
```




```
x=-2:.01:2;
x=x+eps;
y=x;
i=complex(0,1);
[X Y]=meshgrid(x,y);
Z=X+i*Y;
for j=1:64
    Z=Z-(Z.^8+15*Z.^4-16)./(8*Z.^7+60*Z.^3);
end
% imshow(Z);
% coefficents of x^3-1 in order are 1 0 0 -1
 r=roots([1 0 0 0 15 0 0 0 -16]);
 Z1=abs(Z-r(1))<=0.1;
 Z2=abs(Z-r(2))<=0.1;
 Z3=abs(Z-r(3))<=0.1;
 a(:,:,1) = Z1*1;
a(:,:,2) = Z2*1;
a(:,:,3) = Z3*1;
figure
imshow(a)
```

Output: