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```
clc
clear
```

### Q1

```
z1=3-3*j;
real(z1)
imag(z1)
```

```
ans =

      3
```

```
ans =

     -3
```

### Q2

```
z2=4+1i;
conj(z2)
```

```
ans =
```

---

$$4.0000 - 1.0000i$$

## Q3

```
z3=-1/2+j/5;  
rho3=abs(z3);  
theta3=angle(z3);  
x3=rho3*exp(i*theta3)
```

*x3* =

$$-0.5000 + 0.2000i$$

## Q4

```
z4=-2*j*exp(j*pi/12)
```

*z4* =

$$0.5176 - 1.9319i$$

## Q5

```
z5=12-3*j;  
abs(z5)
```

*ans* =

$$12.3693$$

## Q6

```
z6=(-2+j*sqrt(2))/sqrt(3);  
phase=angle(z6)
```

*phase* =

$$2.5261$$

## Q7

```
z7=(-3+2*j)^(-1)
```

---

$z7 =$

$-0.2308 - 0.1538i$

## Q8

$z8 = (1+j)/(2-j)$

$z8 =$

$0.2000 + 0.6000i$

## Q9

```
clc
clear
syms d(s);
d=(s+1)/(s^2+3*s+2);
simplifyFraction(d);

[a,s]=residue([1,1],[1,3,2])
```

$a =$

$\begin{matrix} 1 \\ 0 \end{matrix}$

$s =$

$\begin{matrix} -2 \\ -1 \end{matrix}$

## Q10

```
A1=[6,-0.5;0.5,-1];
deter1=det(A1);
```

## Q11

```
A2=[2,18;-2/3,-6];
nullvector11=null(A2)
```

$nullvector11 =$

---

```
-0.9939  
0.1104
```

## Q12

```
A3=[-9,5;-24,11];  
eig(A3)
```

```
ans =
```

```
1.0000 + 4.4721i  
1.0000 - 4.4721i
```

## Q13

```
A4=[9,1;-5,15];  
[R_Vector4,eignvalue4]=eig(A4)  
A44=A4.';  
[L_Vector4,eignvalue4]=eig(A44)
```

```
R_Vector4 =
```

```
-0.7071    -0.1961  
-0.7071    -0.9806
```

```
eignvalue4 =
```

```
10     0  
0     14
```

```
L_Vector4 =
```

```
-0.9806     0.7071  
0.1961    -0.7071
```

```
eignvalue4 =
```

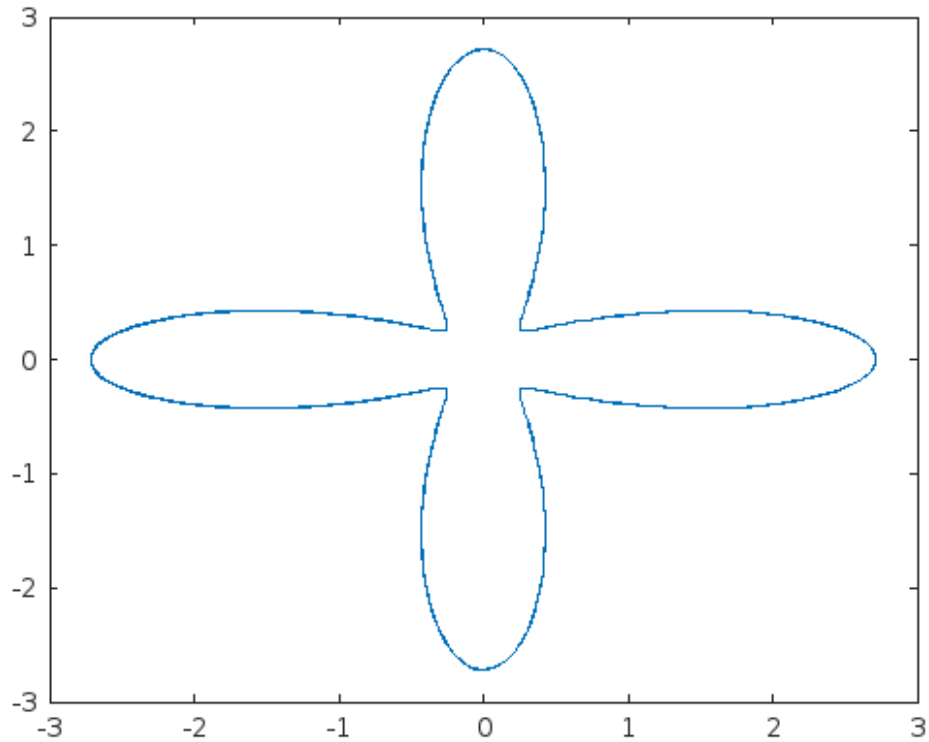
```
10     0  
0     14
```

## Q14

```
clc  
clear
```

---

```
f=@(t) exp(cos(4*t)+1i*t);
t_14=linspace(-10,10,1000);
plot(real(f(t_14)),imag(f(t_14)))
```



## Q15

```
clc
clear
n =1000
H=@(s) 1/(s^2+s+3);
w_15=linspace(-10,10,n);
%plot(real(H(w_15*1i)),imag(H(w_15*1i)))

x=linspace(1,10,n);
y=linspace(1,10,n);

for i=(1:1:n);
    x(i)=real(H(w_15(i)*1i));
    y(i)=imag(H(w_15(i)*1i));
end

plot(x,y);

w_15=linspace(-10,10,n);
z_15=linspace(-10,10,n);
for i=(1:1:n);
```

---

```

        z_15(i)=abs(H(w_15(i)*1i));
    end
    plot(w_15,z_15)

```

```

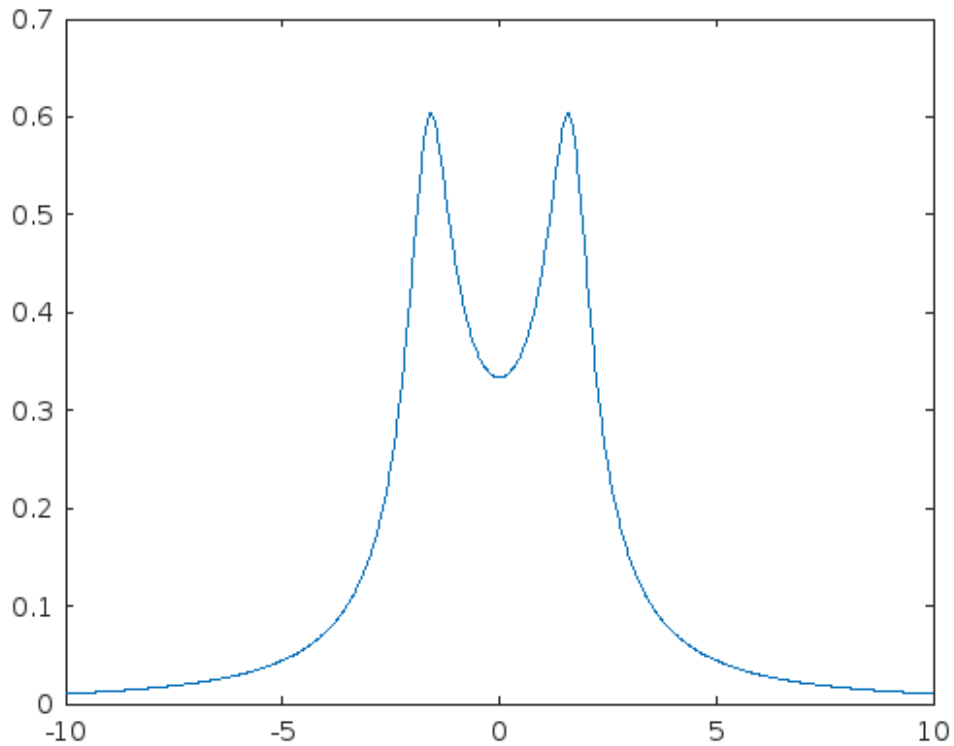
n =

```

```

    1000

```

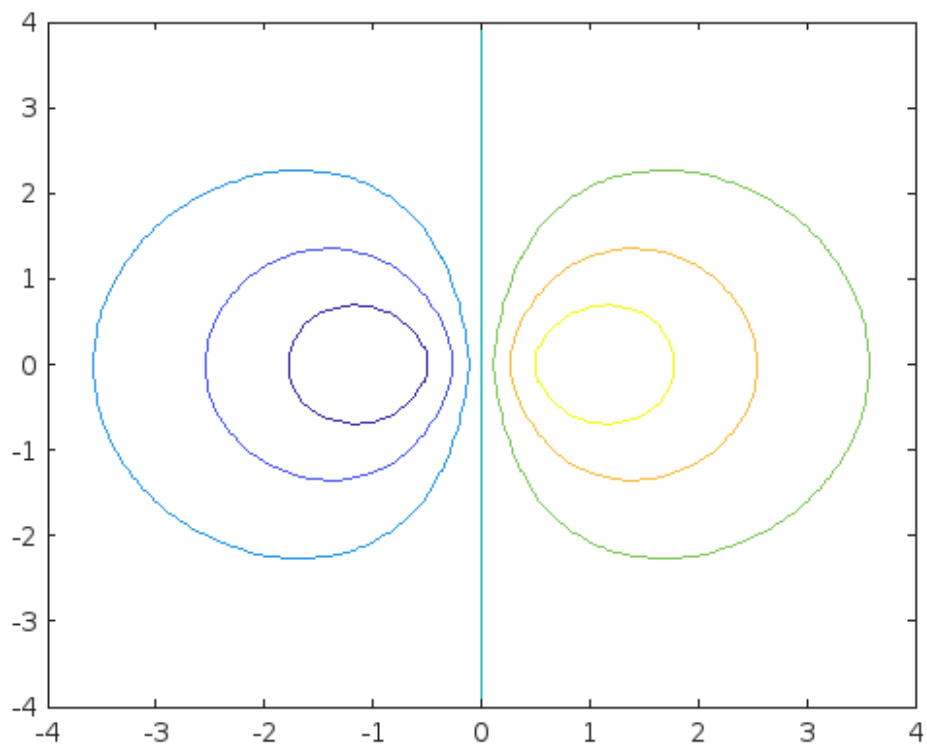


## Q16

```

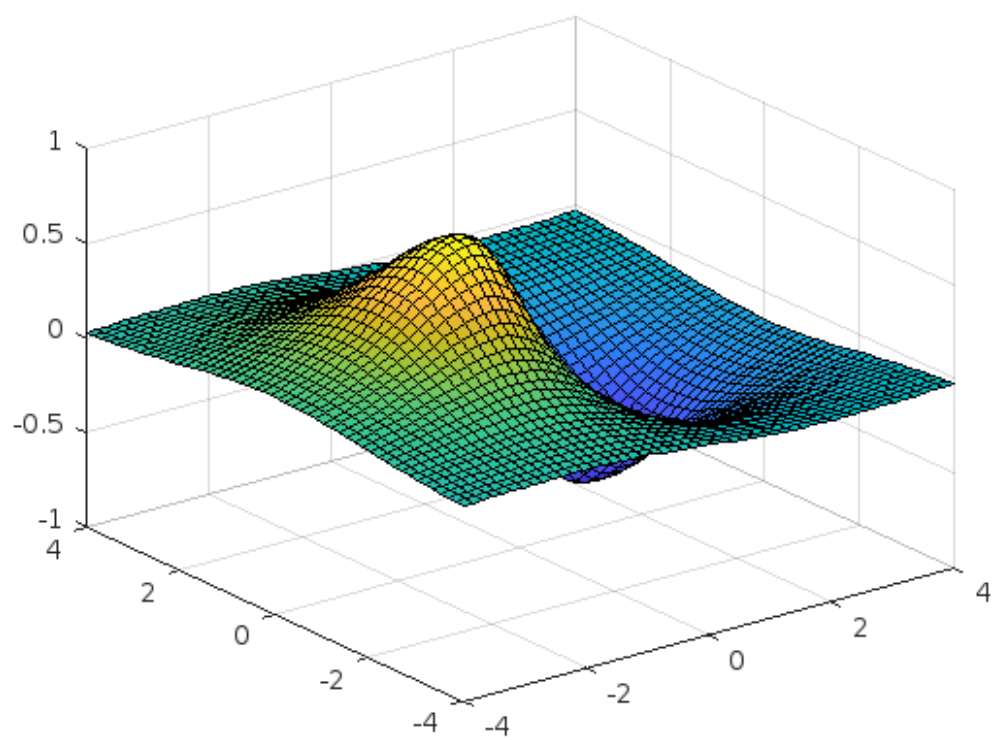
clc
clear
n2=100;
H2=@(s) (s+conj(s))/(exp(abs(s)));
x2=linspace(-4,4,n2);
y2=linspace(-4,4,n2);
z2=zeros(n2);
for i=(1:1:n2);
    for j=(1:1:n2);
        z2(j,i)=H2(x2(i)+1i*y2(j));
    end
end
contour(x2,y2,z2)

```



## Q17

```
clc
clear
n3=50;
H3=@(s) 1i*(s-conj(s))/exp(abs(s));
x3=linspace(-4,4,n3);
y3=linspace(-4,4,n3);
z3=zeros(n3);
for i=(1:1:n3);
    for j=(1:1:n3);
        z3(i,j)=H3(x3(i)+1i*y3(j));
    end
end
surf(x3,y3,z3)
```



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