

Q2)

```
%% Proof of that u is harmonic for a)
syms x
syms y
u=exp(y)*cos(x);
diff(u,y,2)+diff(u,x,2)
% ans is 0
```

```
%% Proof of that u is harmonic for a)
syms x
syms y
u=2*x-x^3+3*x*y^2;
diff(u,y,2)+diff(u,x,2)
% ans is 0
```

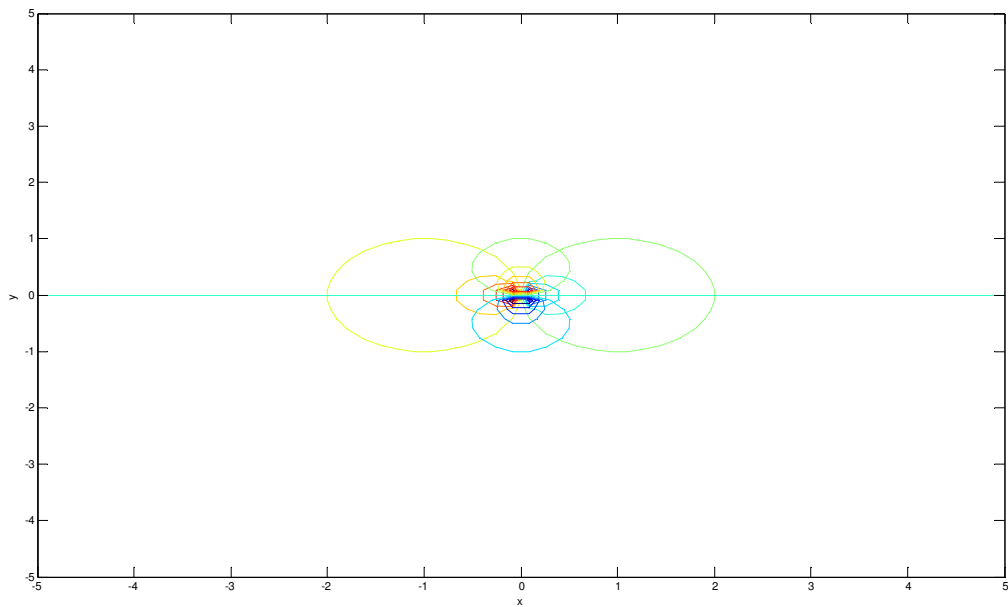
```
%% Find v for i)
syms x
syms y
u=exp(y)*cos(x);

int(diff(-u,y))
% ans = -exp(y)*sin(x)
```

```
%% Find v for ii)
syms x
syms y
u=2*x-x^3+3*x*y^2;

int(diff(u,x),y)
% ans = 2*y-3*x^2*y+y^3
```

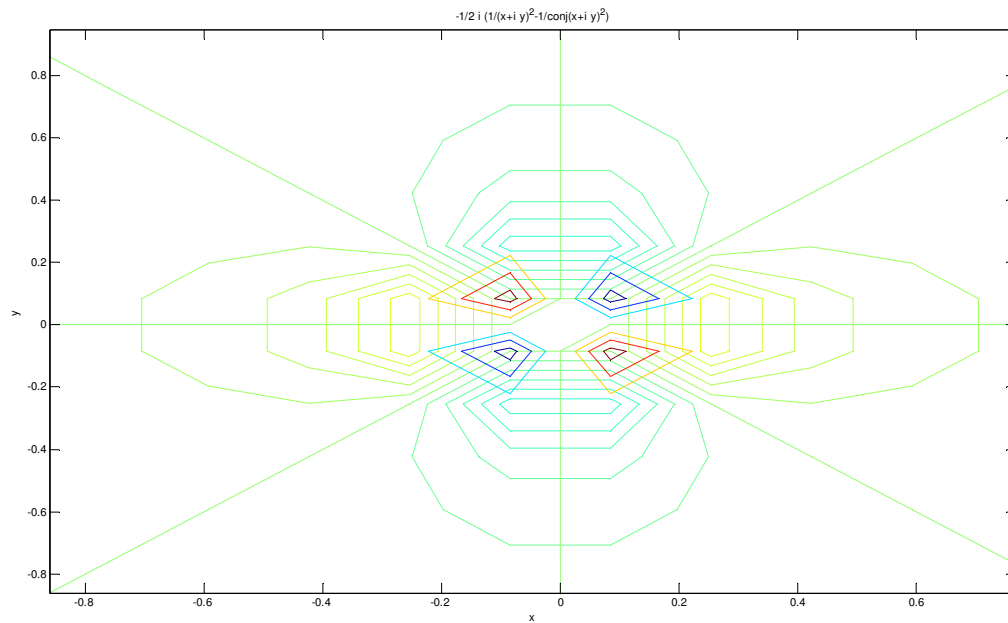
Q3)a)



```
syms z
syms x
syms y
syms u
syms v
syms f
z=x+i*y;
f=(z-2)/z+2;
u=real(f);
v=imag(f);

domain1=[-5 +5 -5 +5];
ezcontour(u,domain1)
domain2=[-5 +5 -5 +5];
hold
ezcontour(v,domain2)
```

b)



```
syms z
syms x
syms y
syms u
syms v
syms f
z=x+i*y;
f=1/z/z;
u=real(f);
v=imag(f);
```

```
domain1=[-5 +5 -5 +5];
ezcontour(u,domain1)
domain2=[-5 +5 -5 +5];
hold
ezcontour(v,domain2)
```

```
Q4) syms z
syms x
syms y
syms u
syms v
syms f
z=x+i*y;
f1=exp(2*z+i);
f2=exp(i*z*z);

f1=exp(2*x+2*i*y+i)
f2=exp(i*(x+i*y)^2)
```