LA4

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1. Plot the reflection of the points $(3, 2)$ and $(5, 1)$ with respect to both the X-axis and Y-axis in the same plane.

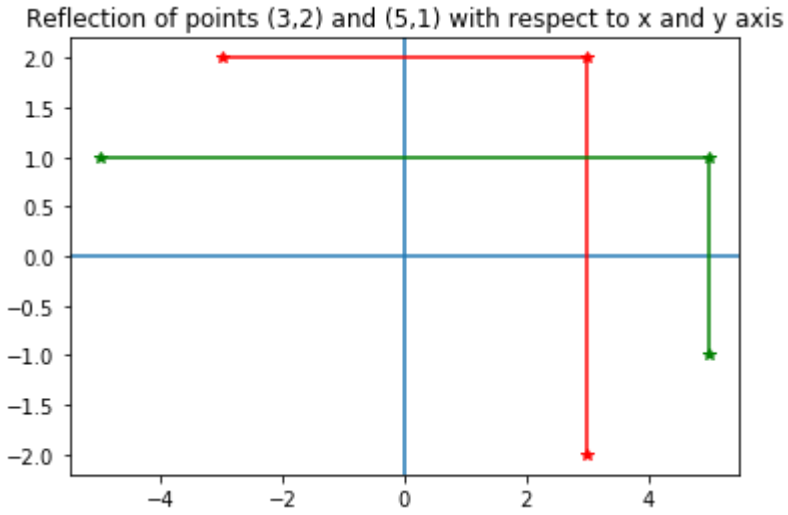
In [6]:

```
def ref(a,b,c,d):
    import matplotlib.pyplot as plt
    import cmath
    import sympy as sp
    z1 = complex(a,b)
    z2 = complex(c,d)
    z1xx = [-a,a,a]
    z1yx = [b,b,-b]
    z2xx = [-c,c,c]
    z2yx = [d,d,-d]
    z1c = sp.conjugate(z1)
    z2c = sp.conjugate(z2)
    print("The conjugate of the 1st complex number is: ",z1c)
    print("The conjugate of the 2nd complex number is: ",z2c)
    plt.axhline()
    plt.axvline()
    plt.plot(z1xx,z1yx,marker="*",color="red")
    plt.plot(z2xx,z2yx,marker="*",color="green")
    plt.title("Reflection of points (3,2) and (5,1) with respect to x and y axis")
    #plt.legend("X-Axis Y-Axis (3,2) (5,1)")
```

In [7]:

```
a = int(input("Enter the x - coordinate of the 1st point: "))
b = int(input("Enter the y - coordinate of the 1st point: "))
c = int(input("Enter the x - coordinate of the 2nd point: "))
d = int(input("Enter the y - coordinate of the 2nd point: "))
ref(a,b,c,d)
```

```
Enter the x - coordinate of the 1st point: 3
Enter the y - coordinate of the 1st point: 2
Enter the x - coordinate of the 2nd point: 5
Enter the y - coordinate of the 2nd point: 1
The conjugate of the 1st complex number is:  3.0 - 2.0*I
The conjugate of the 2nd complex number is:  5.0 - 1.0*I
```



2. Find the Bilinear Transformation which maps $z = 1, i, -1$ onto $w = 1, 0, -1$ respectively.

In [16]:

```
def bil(a,r):
    import sympy as sp
    z,w = sp.symbols('z w')
    LHS = ((z-a[0])/(a[0]-a[1]))*((a[1]-a[2])/(a[2]-z))
    RHS = ((w-r[0])/(r[0]-r[1]))*((r[1]-r[2])/(r[2]-w))
    k1 = sp.Eq(LHS,RHS)
    k2 = sp.solve(k1,w)
    print(k2)
```

In [17]:

```
a = ([1,1j,-1])
b = ([1,0,-1])
bil(a,b)
```

```
[(-z + I)/(I*z - 1.0)]
```

3. Plot the translation of the point $u = 3 + 2i$ using the complex constant $c = 2 + 3i$ in the same polar plane.

In [18]:

```
def trans(r,i,rc,ic):
    import cmath
    import matplotlib.pyplot as plt
    z = complex(r,i)
    zc = complex(rc,ic)
    print("The entered complex number is: ",z)
    print("The entered complex constant is: ",zc)
    tr = z + zc
    print("The translation is: ",tr)
    plt.polar([z,tr],marker=".")
    plt.show()
```

In [19]:

```
a = int(input("Enter the real part of the complex number: "))
b = int(input("Enter the imaginary part of the complex number: "))
c = int(input("Enter the real part of the complex constant: "))
d = int(input("Enter the imaginary part of the complex constant: "))
trans(a,b,c,d)
```

```
Enter the real part of the complex number: 3
Enter the imaginary part of the complex number: 2
Enter the real part of the complex constant: 2
Enter the imaginary part of the complex constant: 3
The entered complex number is:  (3+2j)
The entered complex constant is:  (2+3j)
The translation is:  (5+5j)

C:\Users\Jeevan\Anaconda3\lib\site-packages\numpy\core\_asarray.py:85: Compl
exWarning: Casting complex values to real discards the imaginary part
  return array(a, dtype, copy=False, order=order)
```