1. Find the inverse of the following matrix M. 2. Find the determinant and the eigen values of the above matrix. 3. Using Matrix inversion, solve the following system of equations 4. Plot x^2 + y^2 = 25 5. Plot z = sin x + sin y using imshow from -4pi to 4pi for both x and y.

In [3]:

```
import numpy as np
A=np.array([[1,4,4,1],[0,1,-2,2],[3,3,1,4],[0,1,-3,-2]])
A
```

Out[3]:

```
array([[ 1,  4,  4,  1],
       [ 0,  1, -2,  2],
       [ 3,  3,  1,  4],
       [ 0,  1, -3, -2]])
```

In [5]:

```
A_inv = np.linalg.inv(A)
A_inv
```

Out[5]:

```
array([[-0.22222222, -0.51851852,  0.40740741,  0.18518519],
       [ 0.22222222,  0.18518519, -0.07407407,  0.14814815],
       [ 0.08888889, -0.12592593, -0.02962963, -0.14074074],
       [-0.02222222,  0.28148148,  0.00740741, -0.21481481]])
```

In [6]:

```
A_det = np.linalg.det(A)
A_det
```

Out[6]:

```
135.00000000000003
```

In [7]:

```
E=np.matrix([[1,4,4,1],[0,1,-2,2],[3,3,1,4],[0,1,-3,-2]])
eigvals=np.linalg.eigvals(E)
print(eigvals)
```

```
[ 2.731601+3.2150887j   2.731601-3.2150887j  -2.231601+1.61396767j
 -2.231601-1.61396767j]
```

In [9]:

```
F=np.array([[3,-1,2],[2,1,-1],[1,3,-5]])
F_inv=np.linalg.inv(F)
F_inv
```

Out[9]:

```
array([[ 0.4, -0.2,  0.2],
       [-1.8,  3.4, -1.4],
       [-1. ,  2. , -1. ]])
```

In [11]:

```
import matplotlib.pyplot as plt
def gra(formula, x_range, y_range, z_range):
    x = np.array(x_range)
    y = eval(formula)
    plt.plot(x, y)
    plt.show()

gra(x**2+y**2+z**2=25,10,20,30)
```

```
  File "<ipython-input-11-dc02a7e9dfee>", line 8
    gra(x**2+y**2+z**2=25,10,20,30)
       ^
SyntaxError: keyword can't be an expression
```