Question 1

In [5]:

```
from functionLibrary import gaussj

matrix = open("q1-matrix.txt", "r+")

M = []
N = []

for row in matrix:
    e1 = row.split()
    fe1 = []
    for i in range(len(e1)-1):
        fe1.append(float(e1[i]))
    M.append(fe1)
    e2 = row.split()
    N.append(float(e2[len(e1)-1]))

print("The solution of the given system of equations is:")

gaussj(M,N)
```

```
The solution of the given system of equations is:
[2.000000000000001, -1.3322676295501878e-15, 5.999999999999999, 5.0]
```

Question 2

In [6]:

```
from functionLibrary import gaussj

matrix = open("q2-matrix.txt", "r+")

M = []
N = []

for row in matrix:
    e1 = row.split()
    fe1 = []
    for i in range(len(e1)-1):
        fe1.append(float(e1[i]))
    M.append(fe1)
    e2 = row.split()
    N.append(float(e2[len(e1)-1]))

print("The solution of the given system of equations is:")

gaussj(M,N)
```

```
The solution of the given system of equations is:
[1.0, -2.0, -1.0]
```

Question 3

In [7]:

```
from functionLibrary import inverse
from functionLibrary import matrixProduct

matrix = open("q3-matrix.txt", "r+")

M = []
for row in matrix:
    e1 = row.split()
    fe1 = []
    for i in range(len(e1)):
        fe1.append(float(e1[i]))
    M.append(fe1)

print("The inverse of the given matrix is: ")

inverse(M)


#Verification

n = len(M)
R = []
for i in range(len(M)):
    r = []
    for j in range(n, len(M[0])):
        r.append(M[i][j])
    R.append(r)


matrix = open("q3-matrix.txt", "r+")

Q = []
for row in matrix:
    e1 = row.split()
    fe1 = []
    for i in range(len(e1)):
        fe1.append(float(e1[i]))
    Q.append(fe1)



matrixProduct(Q, R)
print("Clearly, above matrix is an identity matrix.")
```

```
The inverse of the given matrix is:
-0.3333333333333333 0.3333333333333333 0.3333333333333333
-0.16666666666666663 0.16666666666666666 0.6666666666666666
1.3333333333333333 -0.3333333333333333 -1.3333333333333333
Multiplying the two matrices:
1.0 0.0 0.0
0.0 1.0 0.0
5.551115123125783e-17 0.0 1.0
Clearly, above matrix is an identity matrix.
```

Question 4

In [8]:

```
from functionLibrary import determinant

matrix = open("q4-matrix.txt", "r+")

M = []
for row in matrix:
    e1 = row.split()
    fe1 = []
    for i in range(len(e1)):
        fe1.append(float(e1[i]))
    M.append(fe1)

print("The determinant of the given matrix is: ")

determinant(M)
```

```
The determinant of the given matrix is:
65.0
```