

i)

```
>> rref(A)
```

```
ans =
```

```
1  0 -1  0  1
0  1  2  0  1
0  0  0  1  1
0  0  0  0  0
```

ii)

```
>> Ainverse=inv(A)
```

```
Warning: Matrix is close to singular or badly scaled. Results may be inaccurate. RCOND =  
1.572816e-17.
```

```
Ainverse =
```

```
1.0e+15 *
```

```
-0.264917625139441  0.132458812569720  0.529835250278882 -0.397376437709161  
0.529835250278882 -0.264917625139441 -1.059670500557764  0.794752875418323  
-0.264917625139441  0.132458812569721  0.529835250278882 -0.397376437709162  
0.0000000000000000 -0.0000000000000000  0  0.0000000000000000
```

```
>> x=Ainverse*b
```

```
x =
```

```
0  
2  
0  
1
```

iii)

```
>> Adeterminant = det(A)
```

```
Adeterminant =
```

```
-6.794564910705954e-14
```

vi)

```
>> [U,S,V]=svd(A,0)
```

U =

```
-0.146466758492774 -0.892677201383405 -0.219867163199913 0.365148371670110
-0.342529439191373 0.202937482190161 -0.898975321283197 -0.182574185835056
-0.548844829375628 -0.281083770310287 0.293986281997066 -0.730296743340221
-0.748325079902780 0.287985601238608 0.238901377701629 0.547722557505167
```

S =

```
25.472629646106910      0      0      0
      0 5.606265272587247      0      0
      0      0 0.845534508850757      0
      0      0      0 0.000000000000002
```

V =

```
-0.504139121022321 0.148288086126837 0.746450081050980 -0.408248290463863
-0.574260114880352 0.026489017573342 0.053450778656048 0.816496580927726
-0.644381108738383 -0.095310050980151 -0.639548523738885 -0.408248290463863
-0.029018163510808 -0.983984232415845 0.175877731800987 -0.000000000000000
```

vii)

```
>> U*S*transpose(V)
```

ans =

```
1.000000000000002 2.000000000000010 3.000000000000007 5.000000000000001
4.000000000000002 5.000000000000004 6.000000000000004 -0.999999999999996
7.000000000000004 8.000000000000005 9.000000000000004 2.000000000000000
10.000000000000005 11.000000000000009 12.000000000000009 -0.999999999999998
```

viii)

```
>> x=V(:,4)
```

x =

```
-0.408248290463863
0.816496580927726
-0.408248290463863
-0.000000000000000
```

```
>> A*x
```

```
ans =
```

```
1.0e-14 *
```

```
-0.221177243187043
```

```
0.044235448637409
```

```
-0.088470897274817
```

```
0.044235448637409
```

ix)

the non-zero singular values correspond to columns 1, 2, and 3. Columns 1, 2, and 3 are also the basis for the column space of A.