

1)

```
>> A = [3 1; 1 -3; 2 -1]
A =
3      1
1     -3
2     -1
>> A_pinv = inv(A'*A)*A'
A_pinv =
0.2333    0.0333    0.1333
0.1333   -0.2667   -0.0667
```

```
>> format rat
>> A_pinv
A_pinv =
```

```
7/30          1/30          2/15
2/15         -4/15        -1/15
```

2)

```
>> A_pinv
A_pinv =
7/30          1/30          2/15
2/15         -4/15        -1/15
>> b = [-1;2;1]
b =
```

```
-1
2
1
```

```
>> x_ls = A_pinv*b
x_ls =
```

```
-1/30
-11/15
```

4)

```
>> A = [4 6;2 3]
A =
4      6
2      3
```

```
>> b = [3; -2]
b =
```

```
3
-2
>> A_pinv = pinv(A)
```

```
A_pinv =
```

```

4/65          2/65
6/65          3/65

>> A_pinv*b
ans =
8/65
12/65
>> A = [1 2 -2; 2 4 -4; -1 -2 2]
A =
1          2          -2
2          4          -4
-1         -2          2

>> b = [2; 0; -1]
b =
2
0
-1

>> A_pinv = pinv(A)
A_pinv =
1/54          1/27          -1/54
1/27          2/27          -1/27
-1/27         -2/27          1/27

>> x_ls = A_pinv*b
x_ls =
1/18
1/9
-1/9

5)

>> A_pinv = [1/sqrt(2) 1/sqrt(2) 0; 0 0 1; -1/sqrt(2) 1/sqrt(2) 0]*[1/2 0 0;
0 1/sqrt(2) 0; 0 0 1/sqrt(2)]*[1/sqrt(2) 0 1/sqrt(2); 0 -1 0; -1/sqrt(2) 0 1/
sqrt(2)]
A_pinv =
1/4          -1/2          1/4
-1/2          0            1/2
-1/4          -1/2          -1/4

>> A = [1 -1 -1; -1 0 -1; 1 1 -1]
A =
1          -1          -1
-1          0            -1
1           1           -1

>> A*A_pinv
ans =
1          0          0
0          1          0

```

0

0

1