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```
clc; clear; close all
```

Question 1

```
A1 = [[1 -2];[1 -2];[-2 1];[1 -3]];
b = [-2 5 1 -3]';

least_square_system = [A1'*A1 A1'*b];
rref(least_square_system)
```

```
ans =

    1.0000         0         0
         0    1.0000    0.2222
```

Question 5

5.a

```
a = [[8 -8 -2];[4 -3 -2];[3 -4 1]];
a = sym(a);
[Vaa, Daa] = eig(a);
[Va,Ja] = jordan(a) % three distinct eigenvalues
```

```
Va =

[2,   2, 3]
[1, 3/2, 2]
[1,   1, 1]


Ja =

[3, 0, 0]
[0, 1, 0]
[0, 0, 2]
```

5.b

```
b = [[1 0 -4];[0 3 0];[-2 0 -1]];
b = sym(b);
[Vbb, Dbb] = eig(b);
[Vb,Jb] = jordan(b) % two distinct eigenvalues, one repeated eigenvalue
```

```
Vb =

[1, 0, -2]
[0, 1,  0]
[1, 0,  1]


Jb =

[-3, 0, 0]
[ 0, 3, 0]
[ 0, 0, 3]
```

5.c

```
c = [[2 1 1];[0 3 1];[0 -1 1]];
c = sym(c);
[Vcc, Dcc] = eig(c);
[Vc,Jc] = jordan(c) % one eigenvalue
```

```
Vc =

[ 1, 0,  0]
[ 1, 1, -1]
[-1, 0,  1]


Jc =

[2, 1, 0]
[0, 2, 0]
[0, 0, 2]
```

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