1) Oral (does not have to be handed in!)

Give the answer before you calculate with MATLAB!

a)

a = [1 4 6] und b = [-1 2 1].

What's the result when you enter:

a+b, a*2, a/2, a+3, a*b, a.*b, a./b

b)

A = [1 3 5; 2 0 1; 2 4 6];

What's the result when you enter:

A', A(1,:), A(:,3), A(2,2), size(A), numel(A).

c)

A = eye(3,3), B = [1 2 3; 4 5 6; 7 8 9].

What's the result when you enter:

A+B, A*2, B.^2, A.*B, A*B, A=B, A==B, A>B?

2) Production cost

	wage cost [€ / h]	working time [h] to produce one piece		
		product 1	product 2	product 3
turning	10	6	5	4
grinding	12	2	3	1
milling	14	3	2	5
welding	9	4	0	3

a) What does each of the four process steps cost for product 1?

b) What are the unit costs of the three products?

c) What does it cost to produce 10 pieces of product 1, 5 pieces of product 2 and 7 pieces of product 3?

Hint:

solve each task in a <u>single line of code</u>,

use only „*"   „.*" and „ ' ", but <u>do not use the „sum" command</u>

Start with:

h=[6 5 4;   % working time

   2 3 1;

   3 2 5;

   4 0 3];

k=[10, 12, 14, 9];   % wage cost

s=[10, 5, 7];   % pieces

3) Soccer

Matrix A shows the number of goals scored by 11 players over 30 days. Find all results with a single line of MATLAB-code without analyzing the table yourself.

a) The matrix has 31 rows because one row was accidentally entered twice. Find this line and delete it.

b) Replace all negative numbers with zero.

c) Which player has scored a total of 123 goals?

d) How many goals were scored on day 10?

e) Which player scored every day?

f) On which days did more than four players score more than 7 goals?

```
A = [4   8   4   7   4   8   8   3   4   1   1
     8   7   9   7   3   9   2   3   4   5   6
     1   9   0   5   7   6   6   5  -1   6   5
     3   0   9   6   7   2   6   5   8   4   0
     9   3   1   8   6   6   1   3   0   8   0
     9   6   6   0   1   0   4   3   4   7   1
     7   2   5   3   0   4   2   5   8   3   0
     6   2   6   0   5   6   7   6   3   4   4
     3   7   3   1   3   9   2   9   6   3   8
     9   6   6   7   9   8   8   7   8   7   6
     1   5   8   7   9   4   8   4   8   7   5
     7   6   0   8   2   7   3   8   9   4   8
     6   0   0   5   8   4   4   1   1   6   0
     8   3   9   0   8   9   6   0   2   9   9
     3   4   6   9   5   9   8   0   8   7   1
     7   2   2   8   8   8   6   1   5   7   5
     8   7   4   2   9   3   5   3   5   1   1
     3   8   1   5   5   4   3   3   6   3   5
     5   2   2   9   7   2   4   0   8   5   0
     9   7   2   7   5   7   7   5   5   4   7
     5   1   3   8   0   8   8   0   2   0   8
     3   8   1   4   4   9   7   1   4   2   9
     6   1   3   4   6   5   0   6   4   8   9
     3   5   1   5   5   5   6   8   9   0   5
     8   7   4   2   9   3   5   3   5   1   1
     7   3   8   2   3   1   4   9   6   8   2
     4   8   0   7   9   8   4   5   6   0   1
     4   5   9   5   8   4   1   9   7   6   5
     6   4   3   6   8   2   8   5   3   5   5
     9   8  -1   3   3   8   3   5   5   2   7
     3   3   3   1   5   7   2   3   5   5   0]
```

4) Find zero crossings

a) calculate s(t) with time vector t=0 to 5 and step size 0.01
$$s(t) = 20\cos(3\pi t)\cos(2\pi t)$$

b) calculate the number of zero crossings