Zadanie 1

```
a = [1 0 0];
b = [0 5 0];
c = [0 0 3];
```

```
a + b
```

```
ans = 1×3
     1     5     0
```

```
a + c
```

```
ans = 1×3
     1     0     3
```

```
b + c
```

```
ans = 1×3
     0     5     3
```

```
a - b
```

```
ans = 1×3
     1    -5     0
```

```
a - c
```

```
ans = 1×3
     1     0    -3
```

```
b - a
```

```
ans = 1×3
    -1     5     0
```

```
b - c
```

```
ans = 1×3
     0     5    -3
```

```
c - a
```

```
ans = 1×3
    -1     0     3
```

```
c - b
```

```
ans = 1×3
     0    -5     3
```

```
dot(a,b)
```

```
ans =
0
```

```
dot(b,a)
```

```
ans =
0
```

```
% Tak, iloczyn skalarny jest zawsze przemienny
```

```
cross(a,b)
```

```
ans = 1×3
     0     0     5
```

```
cross(b,a)
```

```
ans = 1×3
     0     0    -5
```

```
% Nie, iloczyn wektorowy nie jest przemienny
```

```
dot(cross(a,b),c)
```

```
ans =
15
```

Zadanie 2

```
A = [1 1 1; 2 2 2; 3 3 3];
B = [1 0 0; 0 2 0; 0 0 3];
```

```
A + B
```

```
ans = 3×3
     2     1     1
     2     4     2
     3     3     6
```

```
A - B
```

```
ans = 3×3
     0     1     1
     2     0     2
     3     3     0
```

```
B - A
```

```
ans = 3×3
     0    -1    -1
    -2     0    -2
    -3    -3     0
```

```
A * B
```

```
ans = 3×3
     1     2     3
     2     4     6
     3     6     9
```

```
B * A
```

```
ans = 3×3
     1     1     1
     4     4     4
     9     9     9
```

```
% Nie, mnożenie macierzy nie jest przemienne
```

```
det(A)
```

```
ans =
0
```

```
det(B)
```

```
ans =
6
```

```
%inv(A)
inv(B)
```

```
ans = 3×3
    1.0000         0         0
         0    0.5000         0
         0         0    0.3333
```

```
% Macierz kwadratowa A jest odwracalna jeżeli det(A) != 0
```

```
% Sprawdzenie
B * inv(B)
```

```
ans = 3×3
     1     0     0
     0     1     0
     0     0     1
```

Zadanie 3

```
C = [a; b; c]
```

```
C = 3×3
     1     0     0
     0     5     0
     0     0     3
```

```
D = [a' b' c']
```

```
D = 3×3
     1     0     0
     0     5     0
     0     0     3
```

```
det(C)
```

```
ans =
15
```

```
det(D)
```

```
ans =
15
```

Zadanie 4

```
a1 = [1 2 3 4];
a2 = [1 1 1 1];

A1 = eye(2);
A2 = [1 2; 0 3];
```

```
M = [[a1; a2]; [A1 A2]]
```

```
M = 4×4
     1     2     3     4
     1     1     1     1
     1     0     1     2
     0     1     0     3
```

```
det(M)
```

```
ans =
-8
```

```
inv(M)
```

```
ans = 4×4
   -0.5000    1.0000    0.5000         0
         0    0.7500   -0.7500    0.2500
    0.5000   -0.5000         0   -0.5000
         0   -0.2500    0.2500    0.2500
```

```
M(:,1)
```

```
ans = 4×1
     1
     1
     1
     0
```

```
M(3,:)
```

```
ans = 1×4
     1     0     1     2
```

```
M(4,2)
```

```
ans =
1
```

```
M(4,3)
```

```
ans =
0
```

```
M(2:3,2:4)
```

```
ans = 2×3
     1     1     1
     0     1     2
```

Zadanie 5

```
ciag = 0:9
```

```
ciag = 1×10
     0     1     2     3     4     5     6     7     8     9
```

```
size(ciag)
```

```
ans = 1×2
     1    10
```

```
length(ciag)
```

```
ans =
10
```

```
numel(ciag)
```

```
ans =
10
```

```
macierz = rand(2,4)
```

```
macierz = 2×4
    0.8143    0.9293    0.1966    0.6160
    0.2435    0.3500    0.2511    0.4733
```

```
size(macierz)
```

```
ans = 1×2
     2     4
```

```
length(macierz)
```

```
ans =
4
```

```
numel(macierz)
```

```
ans =
8
```

Różnica między length i size polega na tym, że length zwraca największy z wymiarów macierzy, a size daje wymiary macierzy

Zadanie 6

```
sort(a)
```

```
ans = 1×3
     0     0     1
```

```
sort(b,"descend")
```

```
ans = 1×3
     5     0     0
```

```
sort(A)
```

```
ans = 3×3
     1     1     1
     2     2     2
     3     3     3
```

```
sort(B,"descend")
```

```
ans = 3×3
     1     2     3
     0     0     0
     0     0     0
```

```
eig(A)
```

```
ans = 3×1
    6.0000
   -0.0000
         0
```

```
eig(sort(A))
```

```
ans = 3×1
    6.0000
   -0.0000
         0
```

Zadanie 7

```
magiczna = magic(7)
```

```
magiczna = 7×7
    30    39    48     1    10    19    28
    38    47     7     9    18    27    29
    46     6     8    17    26    35    37
     5    14    16    25    34    36    45
    13    15    24    33    42    44     4
    21    23    32    41    43     3    12
    22    31    40    49     2    11    20
```

```
sum(magiczna(1,:))
```

```
ans =
175
```

```
sum(magiczna(2,:))
```

```
ans =
175
```

```
sum(magiczna(3,:))
```

```
ans =
175
```

```
sum(magiczna(:,1))
```

```
ans =
175
```

```
sum(magiczna(:,2))
```

```
ans =
175
```

```
sum(magiczna(:,3))
```

```
ans =
175
```