

```
%Skriven av  
%John Kågström, Datateknik, ██████████  
%Ivar Wirgén, Datateknik, ██████████  
%För M0048M, LTU.
```

```
%Uppgift 1.
```

```
s=0;  
for k=3:11  
    s=s+((102*k^(-2)) - sin(k^(2)));  
end
```

```
%Uppgift 2.  
  
A=randi([10,100],7,18)  
s=0;  
N=0;  
for i=1:7  
    for j=1:18  
        if A(i,j) >= 35 && A(i,j) <= 55  
            N = N+1;  
            s = s+A(i,j);  
        end  
    end  
end
```

%Uppgift 3.

```
tol=1e-9; s=0; i=0;
term=1;
x=1/5;
while abs(term) > tol
    s=s+term;
    i=i+1;
    term=(-1)^(i+1) * (x-1)^i / i;
end
disp('Approximativt värde på ln(5):'),disp(-s)
```

```
Approximativt värde på ln(5):
0.6094
```

%Vi kan inte sätta $x=5$ direkt i serien eftersom serien bara konvergerar
%för x -värden mellan 0 och 2. Om vi sätter in $x=5$ får vi en divergent
%serie som inte ger oss något meningsfullt svar.

```
%Uppgift 1 (a).
```

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

```
A = 3x3
     1     0     2
     0     3     1
     2     2    -1
```

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

```
B = 3x3
     0     1     1
     2    -2     0
     1     2     3
```

```
C=[2 1; -1 1; 1 2]
```

```
C = 3x2
     2     1
    -1     1
     1     2
```

```
res1=A*B
```

```
res1 = 3x3
     2     5     7
     7    -4     3
     3    -4    -1
```

```
disp(res1)
```

```
     2     5     7
     7    -4     3
     3    -4    -1
```

```
%-----
-
%Uppgift 1 (b).
```

```
res2=B*A
```

```
res2 = 3x3
     2     5     0
     2    -6     2
     7    12     1
```

```
disp(res2)
```

```
     2     5     0
     2    -6     2
     7    12     1
```

```
%-----
-
%Uppgift 1 (c).
```

```
A_transpose=A.'
```

```
A_transpose = 3x3
    1     0     2
    0     3     2
    2     1    -1
```

```
B_transpose=B.'
```

```
B_transpose = 3x3
    0     2     1
    1    -2     2
    1     0     3
```

```
res3=A_transpose*B_transpose
```

```
res3 = 3x3
    2     2     7
    5    -6    12
    0     2     1
```

```
disp(res3)
```

```
    2     2     7
    5    -6    12
    0     2     1
```

```
%-----
-
%Uppgift 1 (d).
```

```
res4= (A+(3*B))*C
```

```
res4 = 3x2
    4    14
   16     5
   10    29
```

```
disp(res4)
```

```
    4    14
   16     5
   10    29
```

```
%-----
-
%Uppgift 3.
```

```
A_3=[4 2 3 1; 2 5 6 2; 0 0 1 3; -1 -2 9 8];
```

```
A3_inv = inv(A_3);
%Visar att A3*inv(A3)=I
disp(A3_inv)
```

```
0.3113    -0.1324    0.0368   -0.0196
-0.1324    0.2059    0.2206   -0.1176
0.0074    0.0441   -0.3456    0.1176
-0.0025   -0.0147    0.4485   -0.0392
```

```
disp(A_3*A3_inv)
```

```
1.0000   -0.0000    0.0000   -0.0000
0.0000    1.0000    0.0000   -0.0000
0.0000         0    1.0000         0
0.0000   -0.0000         0    1.0000
```

```
%-----
-
%Uppgift 5.
```

```
matrix1=[1 2 3; 2 1 2; -1 0 1], matrix2=[1 4 2;2 2 1;-1 1 4]
```

```
matrix1 = 3x3
     1     2     3
     2     1     2
    -1     0     1
matrix2 = 3x3
     1     4     2
     2     2     1
    -1     1     4
```

```
d1 = det(matrix1)
```

```
d1 = -4
```

```
d2 = det(matrix2)
```

```
d2 = -21
```

```
disp(d1), disp(d2)
```

```
-4
```

```
-21
```

```
%Uppgift 5
```

```
% 8 :
```

```
disp("----Uppgift 8----")
```

```
----Uppgift 8----
```

```
% V0 = 100V
```

```
% Vi ser på ekvation nmr 1, att det finns -12 I1 2 I2 0 I3 och 9 I4.
```

```
% Sedan läggs dessa tal in As första position osv med resten av ekvationerna.
```

```
A = [-12 2 0 9; 2 -10 5 0; 0 5 -22 7; 9 0 7 -24];
```

```
B = [-100; 0; 0; 200];
```

```
% C räknar A mot B
```

```
C = A\B;
```

```
% Svar på uppgift 8
```

```
disp("I_1 = " + C(1))
```

```
I_1 = 1.7247
```

```
disp("I_2 = " + C(2))
```

```
I_2 = -1.1466
```

```
disp("I_3 = " + C(3))
```

```
I_3 = -2.9832
```

```
disp("I_4 = " + C(4))
```

```
I_4 = -8.5566
```

```
% Svar på uppgift 8
```

```
% 9 :
```

```
disp("----Uppgift 9----")
```

```
----Uppgift 9----
```

```
% sin(44) = ca 0.69. pi / 4.5 = 0.6981
```

```
a = pi / 4.5;
```

```
% sin(46) = ca 0.72. pi / 4.36 = 0.72
```

```
b = pi / 4.36;
```

```
disp("Alpha = " + a)
```

```
Alpha = 0.69813
```

```
disp("Beta = " + b)
```

```
Beta = 0.72055
```

```
% Ekvationer från uppgift
```

```
A = [1 0 0 0 sin(a) 0; 0 0 1 1 cos(a) 0; 0 1 0 0 0 sin(b); 0 0 0 -1 0  
-cos(b);  
0 0 0 0 -sin(a) -sin(b); 0 0 0 0 -cos(a) cos(b)];
```

```
B = [0; 0; 0; 0; 100; 0];
```

```
C = A\B;
```

```
disp("V_1 = " + C(1))
```

```
V_1 = 48.8661
```

```
disp("V_2 = " + C(2))
```

```
V_2 = 51.1339
```

```
disp("H_1 = " + C(3))
```

```
H_1 = 0
```

```
disp("F_12 = " + C(4))
```

```
F_12 = 58.2364
```

```
disp("F_13 = " + C(5))
```

```
F_13 = -76.0222
```

```
disp("F_23 = " + C(6))
```

```
F_23 = -77.4994
```



```
% Uppgift 6.
```

```
a = 4;
```

```
b = 2;
```

```
% Ekvationen/Integralen för att beräkna omkrets
```

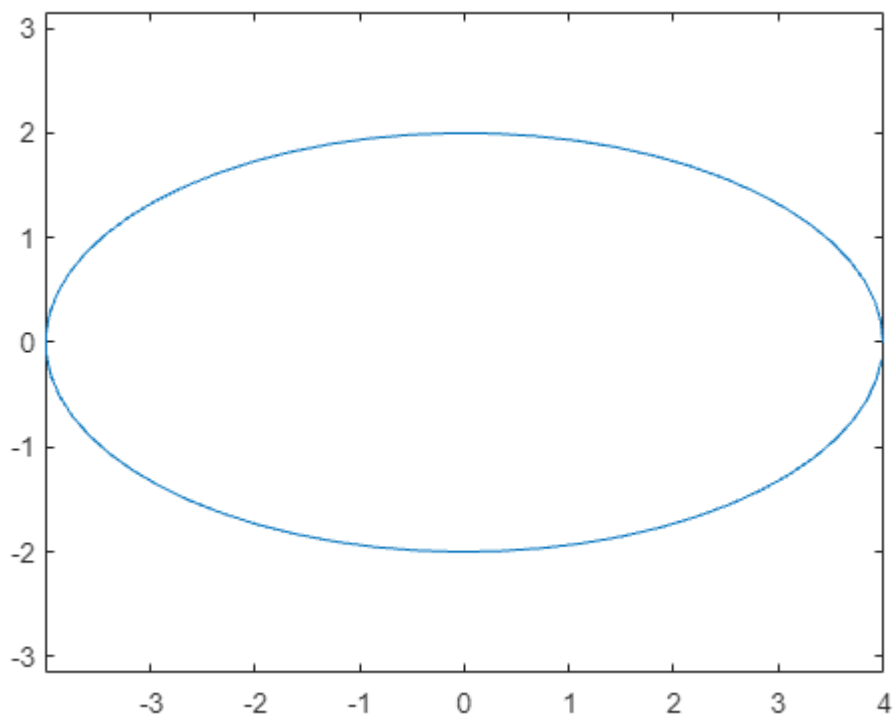
```
f = @(x) sqrt((a*sin(x)) .^2 + (b*cos(x)) .^2);
```

```
Integralens värde = 19.3769
```

```
t=0:0.1:2*pi;
```

```
x=4*cos(t); y=2*sin(t);
```

```
plot(x,y), axis equal
```



```
% Svar
```

```
disp("Integralens värde = " + integral(f, 0, 2*pi))
```