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```
% Written By Oscar Dahlberg  
% For course M0048M at LTU
```

```
% Task 1
```

```
s = 0;  
for k = 2:15  
    s = s + k^4 - 10*k^2;  
end
```

```
disp(s)
```

```
165921
```

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```
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% Task 2

A = randi([10,100],8,20);

s = 0;
N = 0;

for i = 1:8
    for j = 1:20
        if A(i, j) >= 30 && A(i, j) <= 65
            N = N + 1;
            s = s + A(i, j);
        end
    end
end
disp("Sum of numbers between 30 and 65 (including)")
disp(s)
disp("Amount of numbers between 30 and 65 (including)")
disp(N)

Sum of numbers between 30 and 65 (including)
    3301

Amount of numbers between 30 and 65 (including)
     70
```

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% Task 3

tol = 1e-8; s = 0; i = 0;
term = -2/3;
while abs(term) > tol
    s = s + term;
    i = i + 1;
    term = (-1)^(i)*(-2/3)^(i + 1) / (i + 1);
end

disp("Approximativt varde pa ln 3")
disp(-s)

Approximativt varde pa ln 3
    1.0986
```

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```
% Task 4
```

```
% 1
```

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

```
% a) AB
```

```
disp(A*B)
```

```
% b) BA
```

```
disp(B*A)
```

```
% c)  $A^T B^T$ 
```

```
%  $A^T B^T = (AB)^T$ 
```

```
disp((A*B)')
```

```
% d)  $(A + 3B)$ 
```

```
disp((A + 3*B)*C)
```

```
% 3
```

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

```
disp(inv(A))
```

```
% Showing that the inverse of A multiplied by A is equal to I
```

```
disp(A*(inv(A)))
```

```
% 5
```

```
% a)
```

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

```
disp(det(A))
```

```
% b)
```

```
A = [1 4 2; 2 2 1; -1 1 4];
```

```
disp(det(A))
```

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

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

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

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```

      7      3      -1

      4      14
     16      5
     10     29

     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

     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

    -4

   -21

```

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```

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% Task 5

% 8
% I1 I2 I3 I4
A = [-12 2 0 9;
      2 -10 5 0;
      0 5 -22 7;
      9 0 7 -24];
B = [-100; 0; 0; 200];
C = A\B;
disp("I1 = ")
disp(C(1))
disp("I2 = ")
disp(C(2))
disp("I3 = ")
disp(C(3))
disp("I4 = ")
disp(C(4))

% 9
alpha = pi / 4.5;
beta = pi / 3.6;
disp(" ")
% V1 V2 H1 F12 F13 F23
A = [1 0 0 0 sin(alpha) 0;
      0 0 1 1 cos(alpha) 0;
      0 1 0 0 0 sin(beta);
      0 0 0 -1 0 -cos(beta);
      0 0 0 0 -sin(alpha) -sin(beta);
      0 0 0 0 -cos(alpha) cos(beta)];

B = [0; 0; 0; 0; 100; 0];
C = A\B;
disp("V1 = ")
disp(C(1))
disp("V2 = ")
disp(C(2))
disp("H1 = ")
disp(C(3))
disp("F12 = ")
disp(C(4))
disp("F13 = ")
disp(C(5))
disp("F23 = ")
disp(C(6))

I1 =
    1.7247

```

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---

$$I2 = -1.1466$$

$$I3 = -2.9832$$

$$I4 = -8.5566$$

$$V1 = 41.3176$$

$$V2 = 58.6824$$

$$H1 = 0$$

$$F12 = 49.2404$$

$$F13 = -64.2788$$

$$F23 = -76.6044$$

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```
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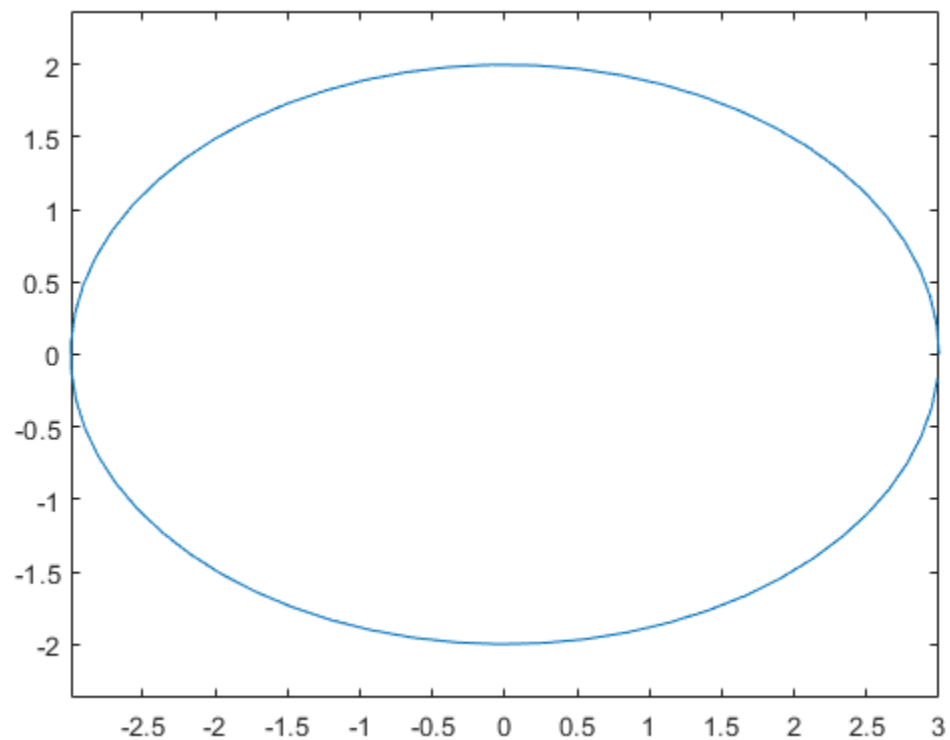
% Task 6

a = 3; b = 2;

f = @(x) sqrt((a*sin(x)).^2 + (b*cos(x)).^2);
disp(integral(f, 0, 2*pi))

t=0:0.1:2*pi;
x=3*cos(t); y=2*sin(t);
plot(x,y), axis equal
```

15.8654



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