```
format short
% probelm1
%(a)
disp('problem1')
v = [-3;3];
A = [cos(pi/5) -sin(pi/5); sin(pi/5) cos(pi/5)];
A*v;
disp('(a) The answer is :')
disp(A*v)
%(b)
B = [cos(pi/13) -sin(pi/13);sin(pi/13) cos(pi/13)];
A*B;
B*A;
disp('(b) We can see that A*B is equal to B*A')
disp('A*B')
disp(A*B)
disp('B*A')
disp(B*A)
%(c)
disp('(c) Rotation matrices satisfy commutative property. That is order of rotation does not matters,end result is the same')
%(d)
C = A*B;
t = acos(C(1,1));
format rat
t/pi;
disp('(d) t/pi = ')
disp(t/pi)
%(e)
format short
D = inv(A);
R5 = [cos(-pi/5) -sin(-pi/5);sin(-pi/5) cos(-pi/5)];
disp('(e) We can see that A^-1 is equal to R_-pi/5')
disp('A^-1')
disp(D)
disp('R_-pi/5')
disp(R5)
%(f)
L0 = [1 0;0 -1];
L5 = A*L0*R5;
disp('(f) The reflection of line thru origin making angle pi/5 is')
disp(L5)
%(g)
L = L0*L5;
M = L5*L0;
disp('(g) The composition L_0 L_pi/5 is not commutative')
disp('L_0 L_pi/5')
disp(L)
disp('L_pi/5 L_0')
disp(M)
%(h)
t = acos(M(1,1));
format rat
n = t/pi;
disp('(h) The angle of rotation of composition of L_pi/5 L_0 is')
disp(n*pi)
%problem2
disp('problem2')
format rat
A = [8 1 2;1 2 2;4 1 3];
%(a)
M = [A eye(3)];
N = rref(M);
X = N(:,4:6);
disp('(a)A^-1 =')
disp(X)
%(b)
inv(A)
disp('(b)')
disp(inv(A))
%problem3
disp('problem3')
A=[6 17 0 11;0 1 4 3;0 0 -5 -1;0 0 0 2];
B=[3 3 1 -1;3 1 2 0;1 3 -1 1;0 -1 0 1];
Z = det(B);
disp('(a) The determinant of A is')
disp(Y)
disp('    The determinant of B is')
disp(Z)
%(b)
disp('(b)The matrix A is upper triangular matrix,hence determinant can easily be calculated without using MATLAB. The operation is : 6*1*(-5)*2=')
disp(6*1*-5*2)
%(c)
C = A*B;
det(C);
disp('(c)C=')
disp(C)
disp('   det(C)=')
disp(det(C))
```

```
%(d)
disp('(d) Since C is prodeuct of upper triangular matrix A with B, the determinant can be calculated by product of determinant of A and B:-6*-60')
disp(-6*-60)
%problem4
disp('problem4')
format rat
A=[-1 1 7 0;4 0 6 -1;1 8 0 2;1 8 2 5];
%(a)
disp('(a)det(A)')
disp(det(A))
%(b)
disp('(b)i.det(B)=-868')
disp('  ii.det(C)=1736')
disp(' iii.det(D)=868')
%(c)
B=A;
temp=B(1,:);
B(1,:)=B(3,:);
B(3,:)=temp;
disp(('B='))
disp(B)
C=A;
C(4,:)=2*C(4,:);
disp('C=')
disp(C)
D=A;
D(4,:)=D(4,:)-D(3,:);
disp('D=')
disp(D)
%(d)
disp('det(B)')
disp(det(B))
disp('det(C)')
disp(det(C))
disp('det(D)')
disp(det(D))
%problem5
disp('problem5')
%(a)
syms a b c d;
A = [a b;c d]
disp('A=')
disp(A)
%(b)
inv(A);
disp('A^-1=')
disp(inv(A))
%(c)
syms e f g h i;
B=[a b c;d e f;g h i];
disp('B^-1')
disp(inv(B))
%(d)
disp('adjB=')
disp(inv(B)*det(B))
```

```
problem1
(a) The answer is :
   -4.1904
    0.6637

(b) We can see that A*B is equal to B*A
A*B
    0.6448   -0.7643
    0.7643    0.6448

B*A
    0.6448   -0.7643
    0.7643    0.6448

(c) Rotation matrices satisfy commutative property. That is order of rotation does not matters,end result is the same
(d) t/pi =
      18/65

(e) We can see that A^-1 is equal to R_-pi/5
A^-1
    0.8090    0.5878
   -0.5878    0.8090

R_-pi/5
    0.8090    0.5878
   -0.5878    0.8090

(f) The reflection of line thru origin making angle pi/5 is
    0.3090    0.9511
    0.9511   -0.3090

(g) The composition L_0 L_pi/5 is not commutative
```

```
L_0 L_pi/5
    0.3090    0.9511
   -0.9511    0.3090

L_pi/5 L_0
    0.3090   -0.9511
    0.9511    0.3090

(h) The angle of rotation of composition of L_pi/5 L_0 is
     142/113

problem2
(a)A^-1 =
       4/23          -1/23          -2/23
       5/23          16/23         -14/23
      -7/23          -4/23          15/23


ans =

       4/23          -1/23          -2/23
       5/23          16/23         -14/23
      -7/23          -4/23          15/23

(b)
       4/23          -1/23          -2/23
       5/23          16/23         -14/23
      -7/23          -4/23          15/23

problem3
(a) The determinant of A is
     -60

    The determinant of B is
      -6

(b)The matrix A is upper triangular matrix,hence determinant can easily be calculated without using MATLAB. The operation is : 6*1*(-5)*2=
     -60

(c)C=
      69             24             40              5
       7             10             -2              7
      -5            -14              5             -6
       0             -2              0              2

   det(C)=
     360

(d) Since C is prodeuct of upper triangular matrix A with B, the determinant can be calculated by product of determinant of A and B:-6*-60
     360

problem4
(a)det(A)
     868

(b)i.det(B)=-868
  ii.det(C)=1736
 iii.det(D)=868
B=
       1              8              0              2
       4              0              6             -1
      -1              1              7              0
       1              8              2              5

C=
      -1              1              7              0
       4              0              6             -1
       1              8              0              2
       2             16              4             10

D=
      -1              1              7              0
       4              0              6             -1
       1              8              0              2
       0              0              2              3

det(B)
    -868

det(C)
    1736

det(D)
     868

problem5

A =

[ a, b]
```

```
[ c, d]

A=
[ a, b]
[ c, d]

A^-1=
[  d/(a*d - b*c), -b/(a*d - b*c)]
[ -c/(a*d - b*c),  a/(a*d - b*c)]

B^-1
[  (e*i - f*h)/(a*e*i - a*f*h - b*d*i + b*f*g + c*d*h - c*e*g), -(b*i - c*h)/(a*e*i - a*f*h - b*d*i + b*f*g + c*d*h - c*e*g),  (b*f - c*e)/(a*e*i - a*
[ -(d*i - f*g)/(a*e*i - a*f*h - b*d*i + b*f*g + c*d*h - c*e*g),  (a*i - c*g)/(a*e*i - a*f*h - b*d*i + b*f*g + c*d*h - c*e*g), -(a*f - c*d)/(a*e*i - a*
[  (d*h - e*g)/(a*e*i - a*f*h - b*d*i + b*f*g + c*d*h - c*e*g), -(a*h - b*g)/(a*e*i - a*f*h - b*d*i + b*f*g + c*d*h - c*e*g),  (a*e - b*d)/(a*e*i - a*

adjB=
[ e*i - f*h, c*h - b*i, b*f - c*e]
[ f*g - d*i, a*i - c*g, c*d - a*f]
[ d*h - e*g, b*g - a*h, a*e - b*d]
```