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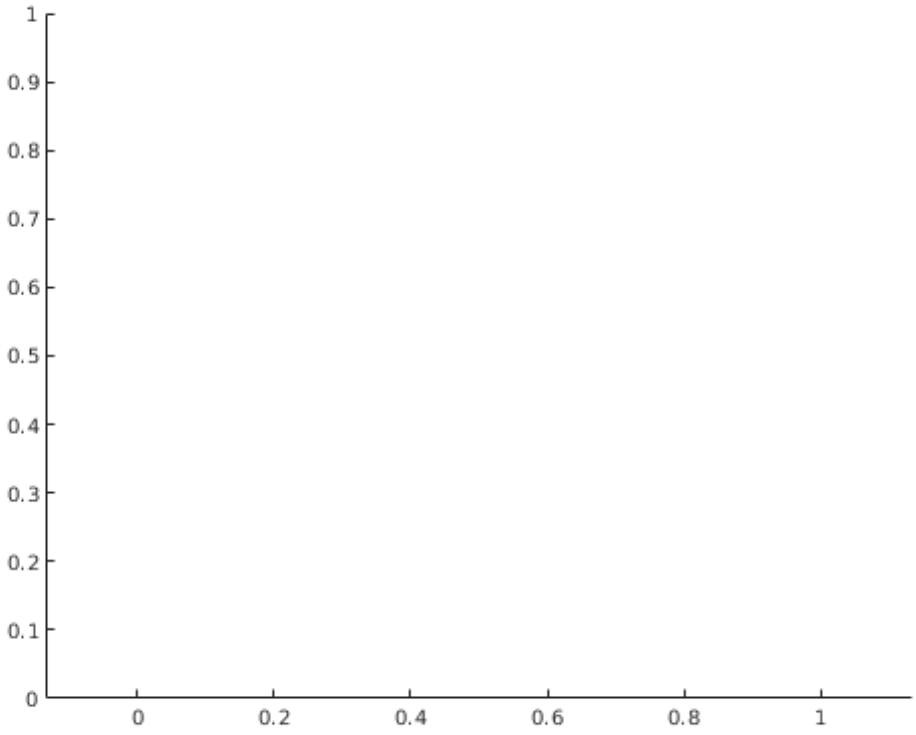
```
axis equal
```



Question 2

```
rot_y = [sqrt(3)/2, 0 , 1/2, 0;
         0,1,0,0;
         -1/2,0,sqrt(3)/2,0;
         0,0,0,1];
rot_x = [1,0,0,0;
         0,0,-1,0;
         0,1,0,0;
         0,0,0,1];

rot_z = eye(4);
```

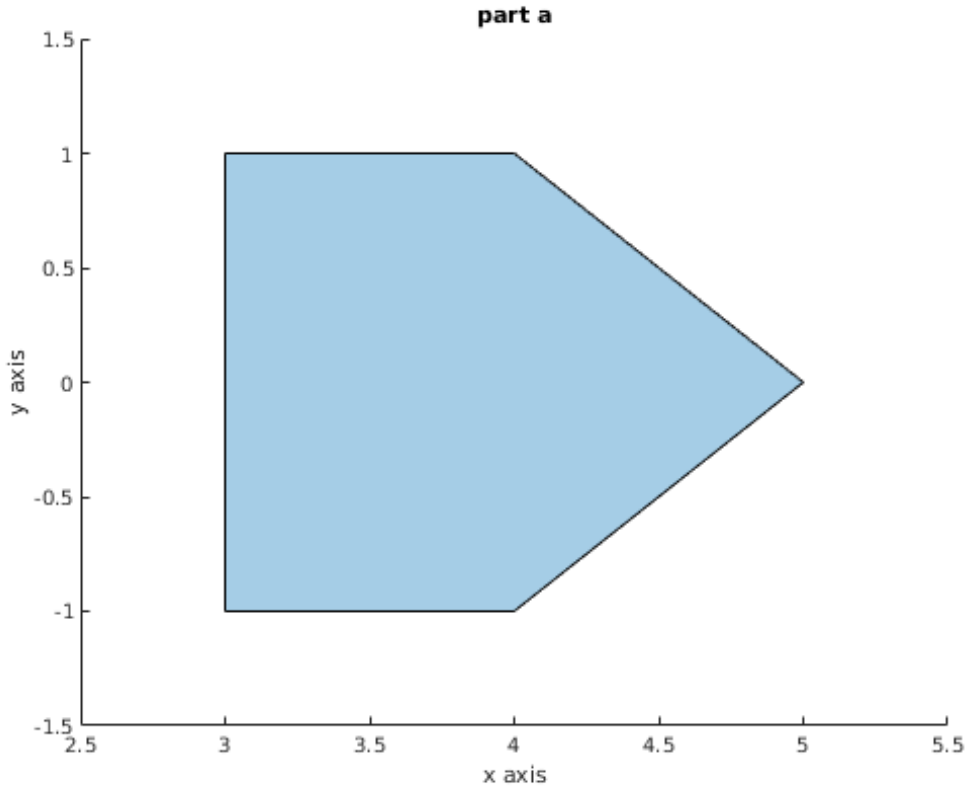
```
R = rot_y * rot_x * rot_z


R =

    0.8660    0.5000         0         0
         0         0   -1.0000         0
   -0.5000    0.8660         0         0
         0         0         0    1.0000
```

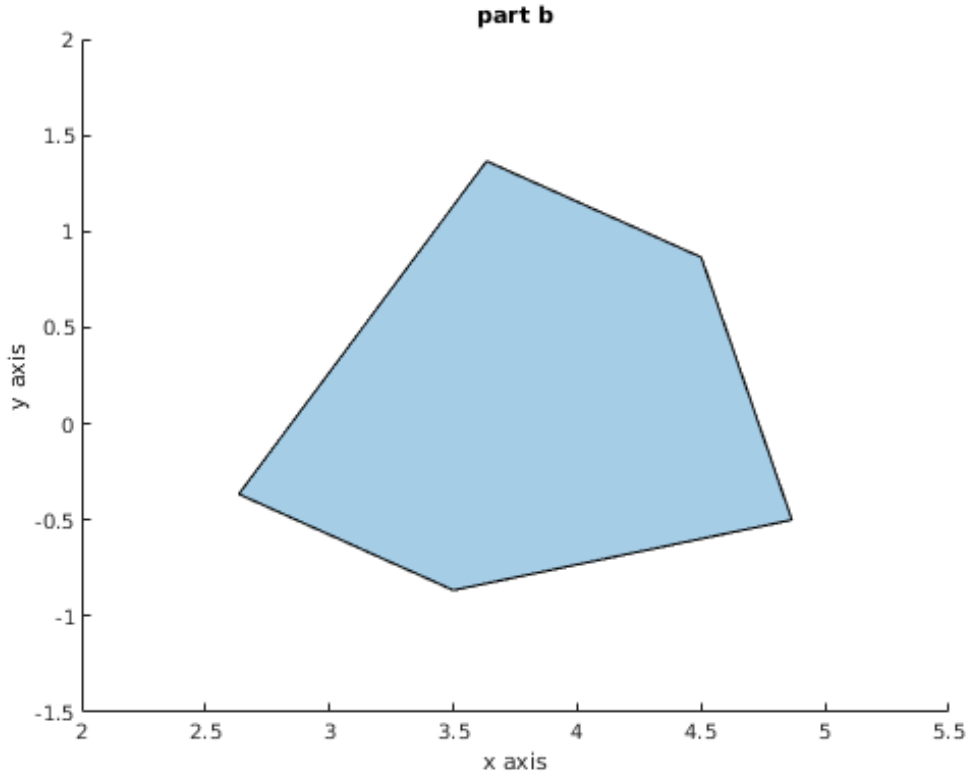
Question 3

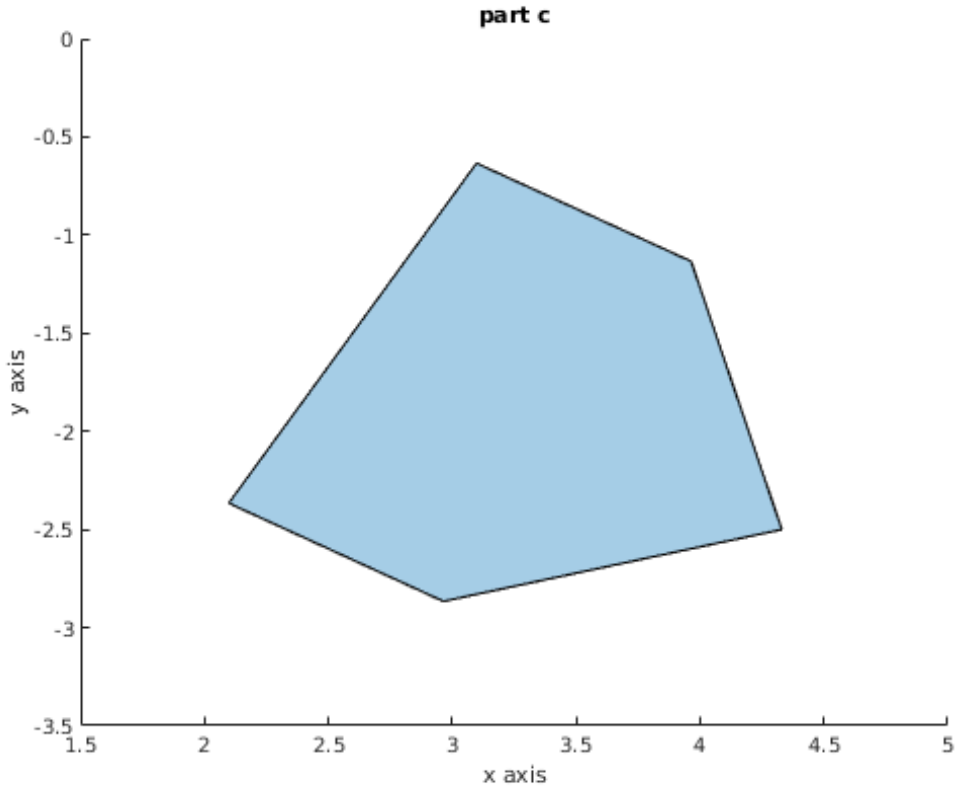
```
p = [1,0;0,1;-1,1;-1,-1;0,-1]'


A = [1,0,4;0,1,0;0,0,1;];
B = [0.866 ,0.5, 0;-0.5, 0.866,0;0,0,1;];

% part a
p_a = apply_transformation(p,A);
pgon = polyshape(p_a(1,:),p_a(2,:));
figure();
plot(pgon);
title('part a')
xlabel('x axis')
ylabel('y axis')

%part b
transformation = A*B;
p_b = apply_transformation(p,transformation);
pgon = polyshape(p_b(1,:),p_b(2,:));
figure();
plot(pgon);
title('part b')
xlabel('x axis')
ylabel('y axis')

%part c
transformation = B*A;
p_c = apply_transformation(p,transformation);
pgon = polyshape(p_c(1,:),p_c(2,:));
figure();
plot(pgon);
title('part c')
xlabel('x axis')
ylabel('y axis')

%part d
transformation = B;
p_d = apply_transformation(p,transformation);
pgon = polyshape(p_d(1,:),p_d(2,:));
figure();
```

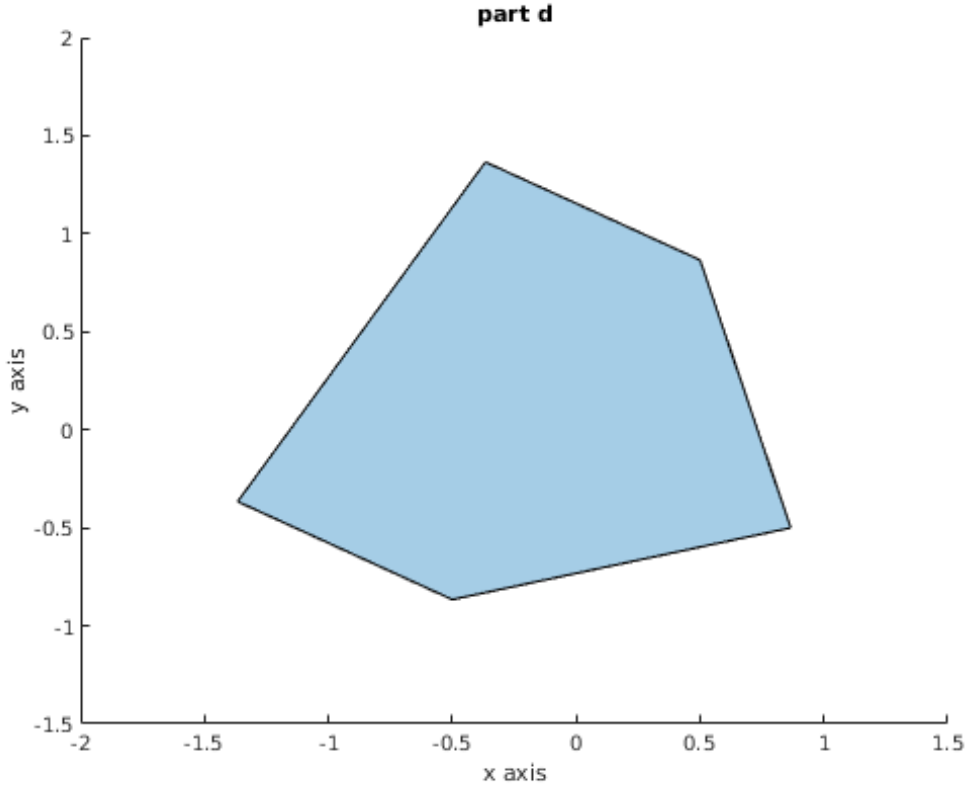
```
plot(pgon);
title('part d')
xlabel('x axis')
ylabel('y axis')

%part e
transformation = A*B;
p_e = apply_transformation(p,transformation);
pgon = polyshape(p_e(1,:),p_e(2,:));
figure();
plot(pgon);
title('part e')
xlabel('x axis')
ylabel('y axis')

%part f
transformation = B*A;
p_f = apply_transformation(p,transformation);
pgon = polyshape(p_f(1,:),p_f(2,:));
figure();
plot(pgon);
title('part f')
xlabel('x axis')
ylabel('y axis')
```

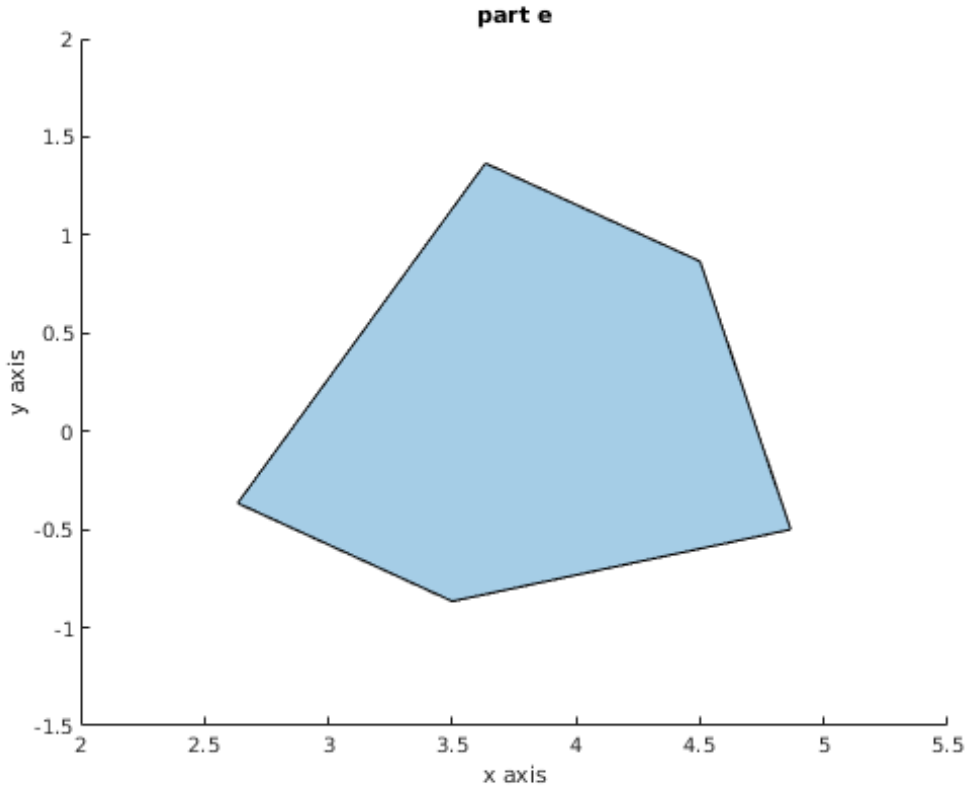
```
p =

     1     0    -1    -1     0
     0     1     1    -1    -1
```

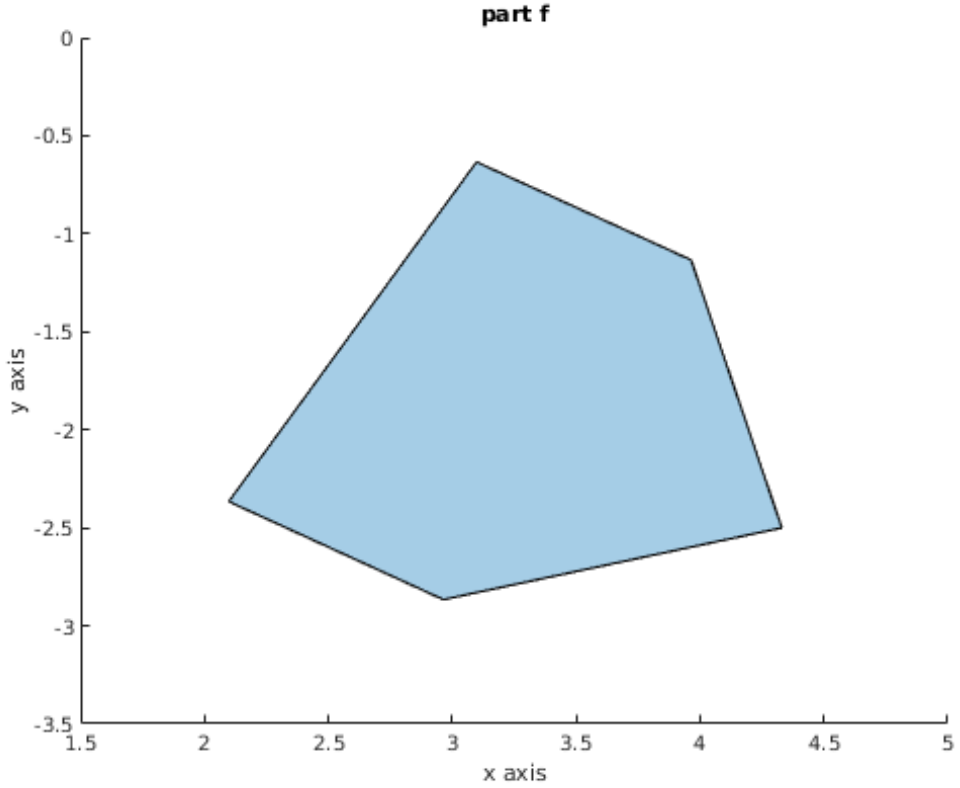

part a
1.5
1
0.5
0
-0.5
-1
-1.5
y axis
2.5
3
3.5
4
4.5
5
5.5
x axis


part b
2
1.5
1
0.5
0
-0.5
-1
-1.5
y axis
2
2.5
3
3.5
4
4.5
5
5.5
x axis


part c
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
y axis
1.5
2
2.5
3
3.5
4
4.5
5
x axis


part d
2
1.5
1
0.5
0
-0.5
-1
-1.5
y axis
-2
-1.5
-1
-0.5
0
0.5
1
1.5
x axis


part e
y axis
x axis
2
1.5
1
0.5
0
-0.5
-1
-1.5
2
2.5
3
3.5
4
4.5
5
5.5


part f
y axis
x axis
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
1.5
2
2.5
3
3.5
4
4.5
5

Question 6

syms c80 s80 s10.5 c10.5

```
tranz1 = eye(4);
tranz1(3,4) = 6;
rotx = [1,0,0,0;0,cosd(80),-sind(80),0;0,sind(80),cosd(80),0;0,0,0,1];
roty = [cosd(-10.5),0,sind(-10.5),0;0,1,0,0;-
sind(-10.5),0,cosd(-10.5),0;0,0,0,1];
tranz2 = eye(4);
tranz2(3,4) = -6;
```

```
Hp_g = tranz1 * rotx * roty*tranz2
```

```
Hp_g =

    0.9833         0   -0.1822    1.0934
   -0.1795    0.1736   -0.9683    5.8099
    0.0316    0.9848    0.1707    4.9756
         0         0         0    1.0000
```

helper function

```
function [output_p] = apply_transformation(p,matrix)
output_p=matrix(1:2,1:2)*p+matrix(1:2,3);
end
```

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