5-Shearing

It produce a distortion of an object. There are two types of shearing

1- Y shearing

It transform the point (X,Y) to the point (Xnew,Ynew) where

$$Xnew = X$$
$$Ynew = Y + Shy * X \qquad \text{where } Shy \neq 0$$

The matrix is

1	Shy	0
0	1	0
0	0	1

Y shearing moves a vertical line up or down depending on the sign of the shear factor Shy. A horizontal line is distorted into a line with slop Shy. And vis versa.

2- X shearing

It transform the point (X,Y) to the point (Xnew,Ynew) where

$$Xnew = X + Shx * Y \qquad \text{where} \quad Shy \neq 0$$
$$Ynew = Y$$

The matrix is

1	0	0
Shx	1	0
0	0	1

Example : Share the object (1,1) , (3,1) , (1,3) , (3,3) with

a: Shx=2

b: Shy=2

Solution : a: Shx=2

1	1	1
3	1	1
1	3	1
3	3	1

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1	0	0
2	1	0
0	0	1

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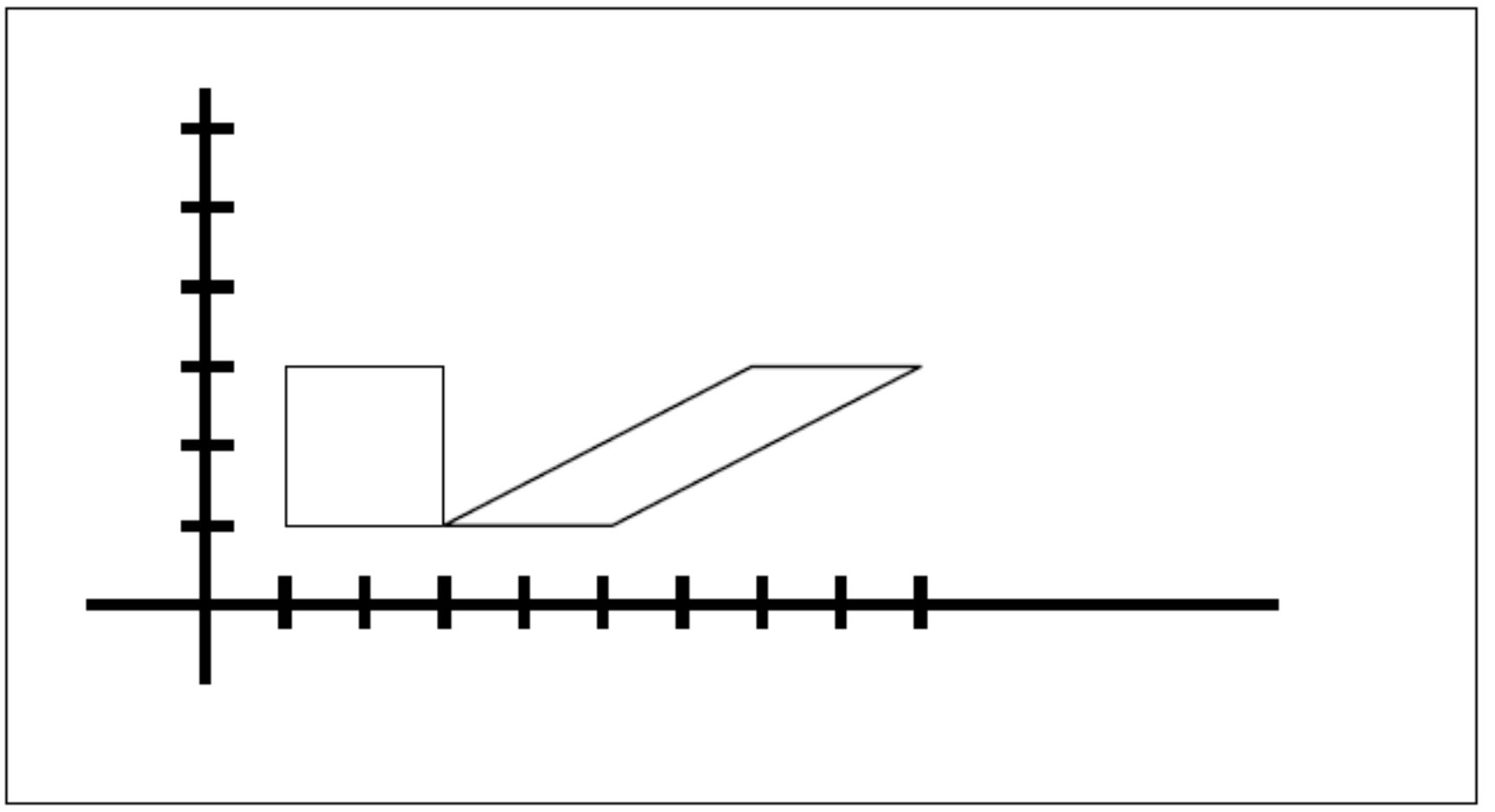
3	1	1
5	1	1
7	3	1
9	3	1



b- Shy

1	1	1
3	1	1
1	3	1
3	3	1

*

1	2	0
0	1	0
0	0	1

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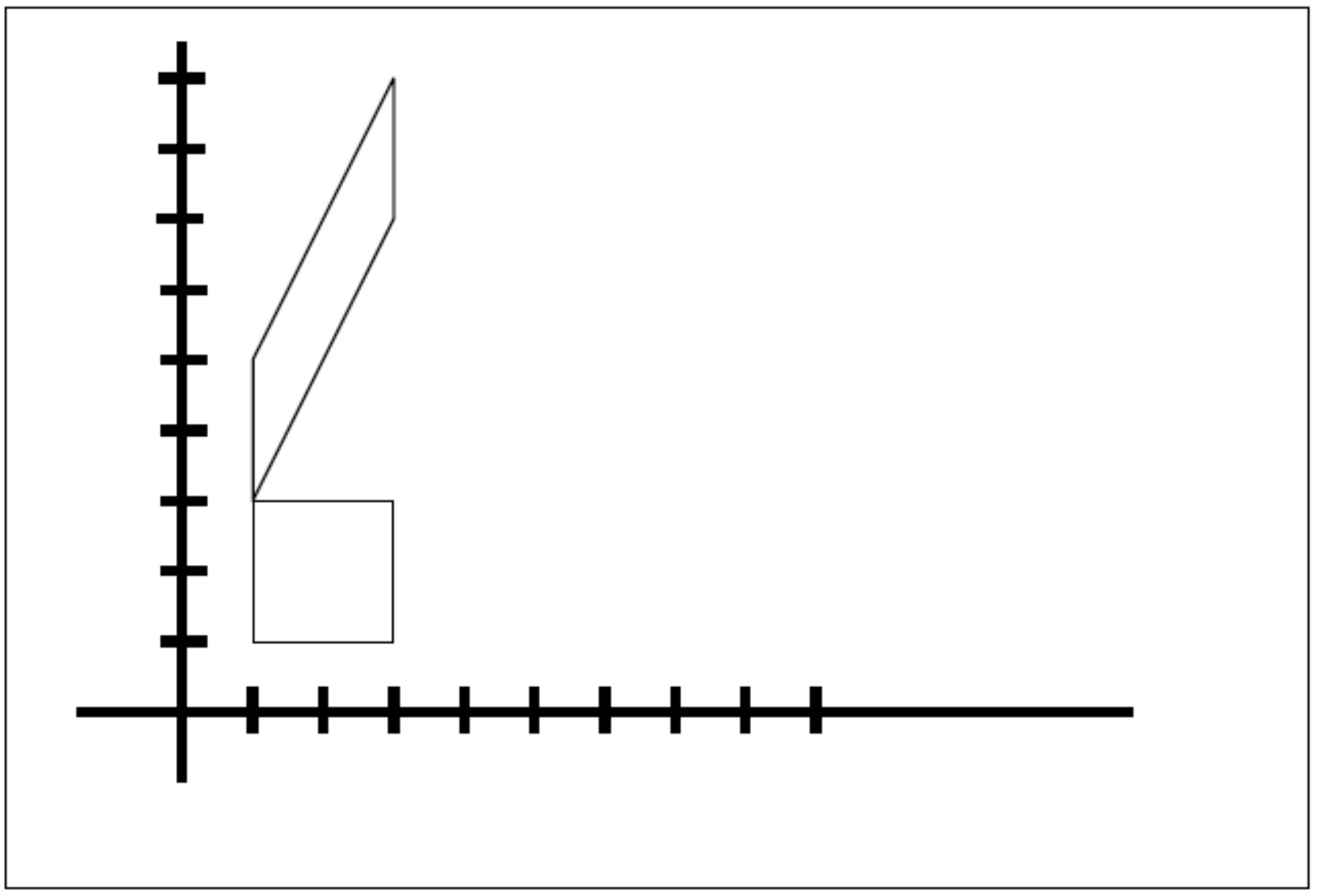
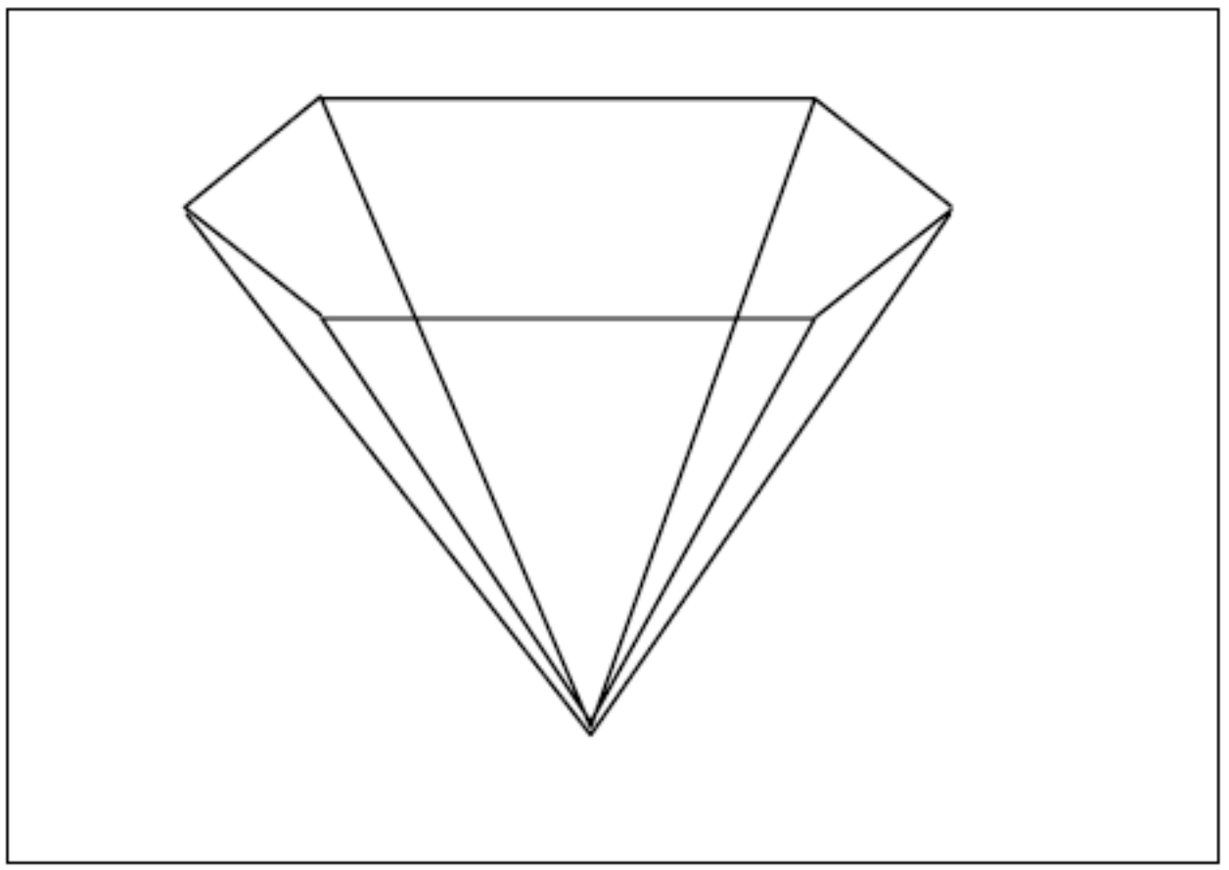
1	3	1
3	7	1
1	5	1
3	9	1



Example : Draw the object (5,30),(-5,30),(-11,24), (-5,18),(5,18),(11,24),(0,0)



1- Share the object with Shx=-1
2- Scale on Sx=2 and Sy=1
3- Rotate the object 11 times with $\acute{O}= \Pi/6$, draw the object after each rotation