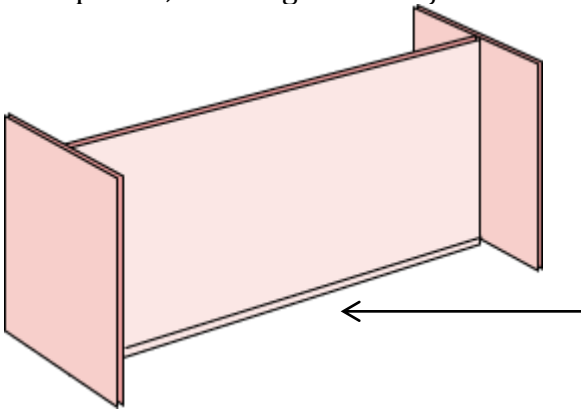


Activity 1: Reflections

You will need a Mira and a ruler for this activity.

A Mira is a plastic drawing device that acts like a mirror. A Mira reflects objects, but since it is also transparent, the image of an object reflected in it also appears behind the Mira.

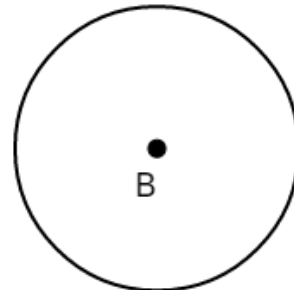
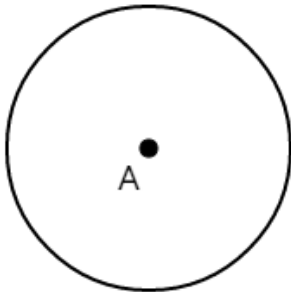


The drawing edge of a Mira is *beveled*.

When using a Mira, place it with the beveled edge down.

Look directly through the Mira from the side with the beveled edge down to locate the image of the object behind the Mira.

Place your Mira so that the image of circle *A* fits on circle *B*. Hold the Mira steady with one hand and draw a line along the drawing edge.



Take away the Mira. You have drawn the line of _____.

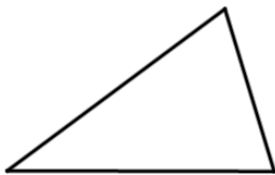
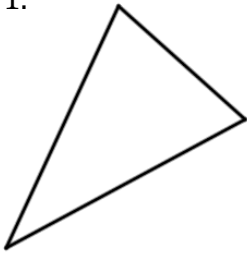
Draw the line segment \overline{AB} . Label the point of intersection with the Mira-line *P*. Measure (in centimeters and/or degrees)

$AP =$ _____ $BP =$ _____

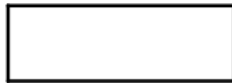
Angle at which \overline{AB} meets the Mira-line: _____

For each pair of figures below, use a Mira to fit the image of one of the figures onto the other. Then draw the line of reflection.

1.



2.



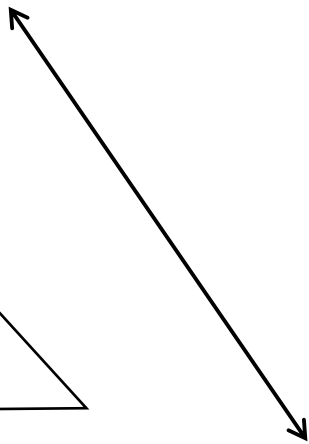
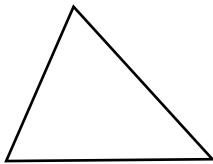
3.



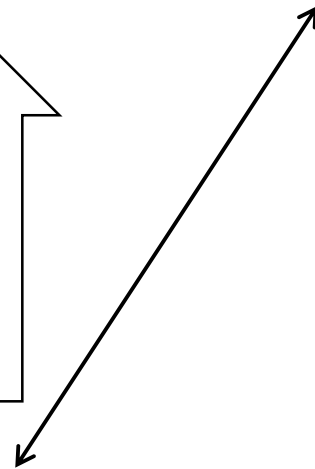
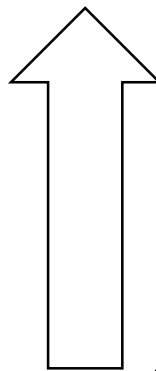
Use a Mira to draw the reflection of each figure through the given line.

*Hint: You can draw a reflection of a polygon by reflecting the **vertices first** and then connecting the dots.*

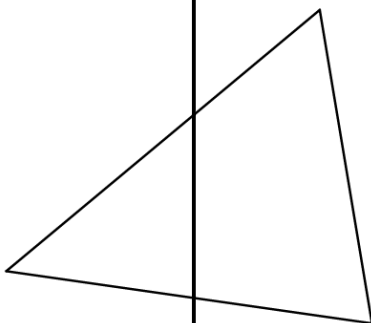
1.



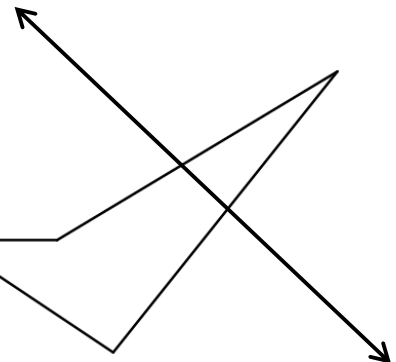
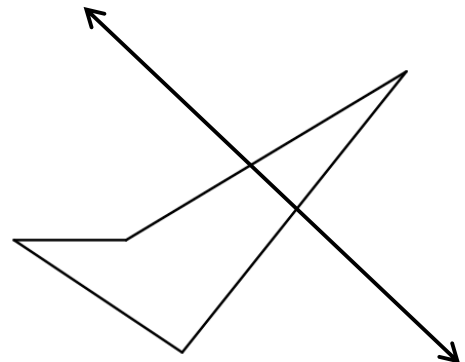
2.



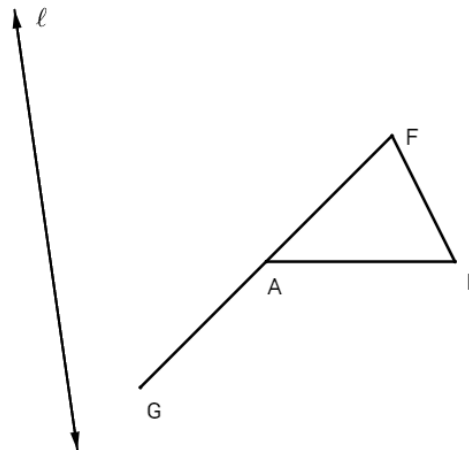
3.



4.



Use a Mira to reflect the figure $FLAG$ through line ℓ . Use prime notation to label the reflection.



Trace $\triangle FAL$ from F to A to L and back to F . What direction (clockwise or counterclockwise) does your pencil move?

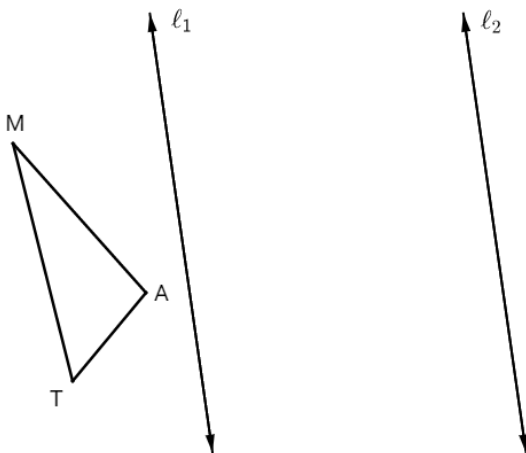
Now trace the image $\triangle F'A'L'$ from F' to A' to L' and back to F' . What direction (clockwise or counterclockwise) does your pencil move?

How does reflecting an image through a line affect its orientation?

Activity 2: Translations

You will need a Mira and a ruler for this activity.

1. Reflect $\triangle MAT$ through line ℓ_1 . Use prime notation to label the reflection.



2. Reflect $\triangle M'A'T'$ through line ℓ_2 . Let M'' , A'' , and T'' denote the images of M' , A' , and T' , respectively.
3. Draw $\overline{MM''}$, $\overline{AA''}$, and $\overline{TT''}$.
4. What **two** relationships do these segments appear to have?

5. What is the name of the transformation from $\triangle MAT$ to $\triangle M''A''T''$?
6. This activity illustrates a theorem from Section 8.6. What does that theorem say?

Activity 3: Rotations

For this activity, you will need a Mira, a ruler, a protractor, and patty paper.

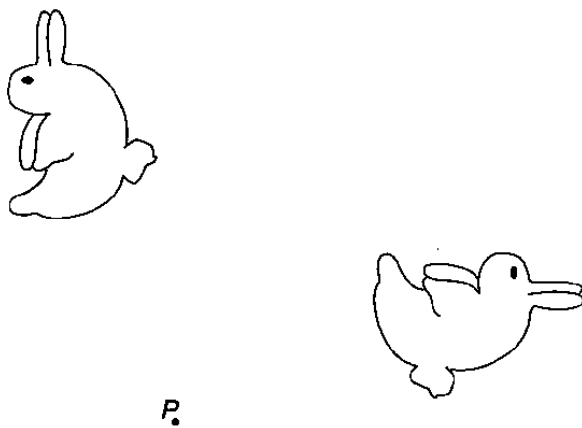


Figure 1

The two drawings in Figure 1 are congruent, but the duck is neither a reflection nor a translation of the rabbit.

1. Use the Mira to verify that the rabbit **cannot** be reflected onto the duck.
2. Trace the rabbit on a piece of patty paper and use it to verify that the rabbit **cannot** be translated onto the duck.
3. Move the patty paper so that the outline is on top of the rabbit, and put the tip of a pencil or compass-point on the point P . Turn the paper about the point P until the rabbit coincides with the duck.

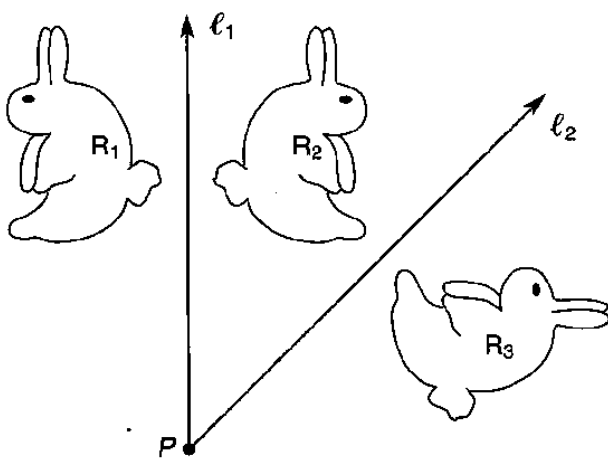


Figure 2

The drawings in Figure 2 show that if the rabbit, R_1 , is reflected through line ℓ_1 and then its image, R_2 , is reflected through line ℓ_2 , then the result is the duck, R_3 .

4. Use the Mira to verify that R_3 is the composition image of the two reflections as described above.
5. Measure the angle between ℓ_1 and ℓ_2 . Make a conjecture about the relationship between this angle and the angle of rotation that transforms the rabbit into the duck.