

12.2 Reflections and Glide Reflections

Look at figure 12-17 on page 845 for an example of a reflection, or flip. The girl's face is *reflected* in the mirror.

For another example of a reflection, let's try to draw a heart by first drawing only the left half, and then reflecting it through the vertical line shown. There are a couple of ways we could complete the drawing.

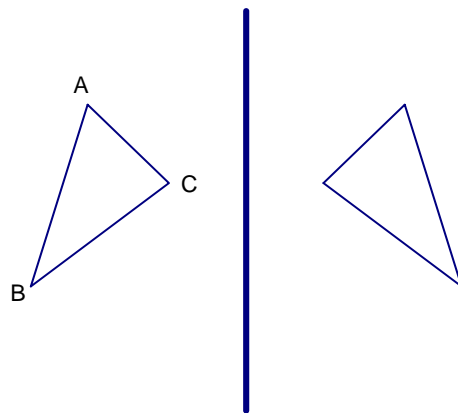
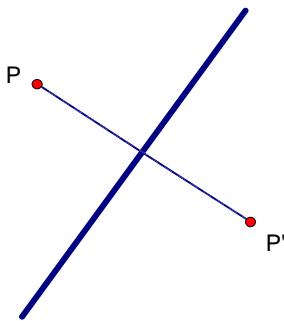
One would be to use paper folding:

The other would use a Mira:



***Is a reflection an isometry?

Here are some more examples of reflections through a line:

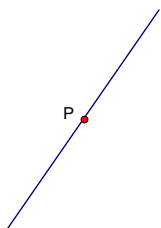


Label the reflected vertices of $\triangle ABC$ as A' , B' and C'

Do you notice anything about the each point and its image under the reflection?

Do you notice anything about the orientation of the triangle in the second figure?

DEFINITION OF A REFLECTION : A reflection in a line l is a motion of a plane that pairs each point P of the plane with a point P' in such a way that l is the perpendicular bisector of $\overline{PP'}$, as long as P is not on l . If P is on l , then $P = P'$. (In other words, P would be its own image.)

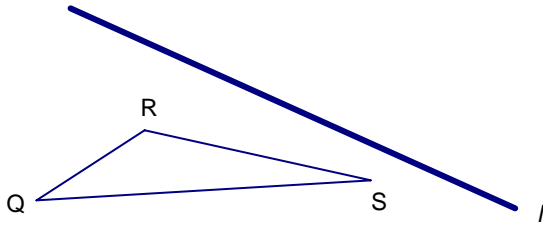


So far, we have talked about reflecting figures by paper folding and using a Mira. There are two other methods that we will be using:

Tracing Paper Method To reflect a figure through a line l using tracing paper, there are three steps:

- 1) Place a reference point P on the line l .
- 2) Trace the figure, the line l and the reference point P onto the tracing paper.
- 3) Flip the tracing paper and realign l , and point P .

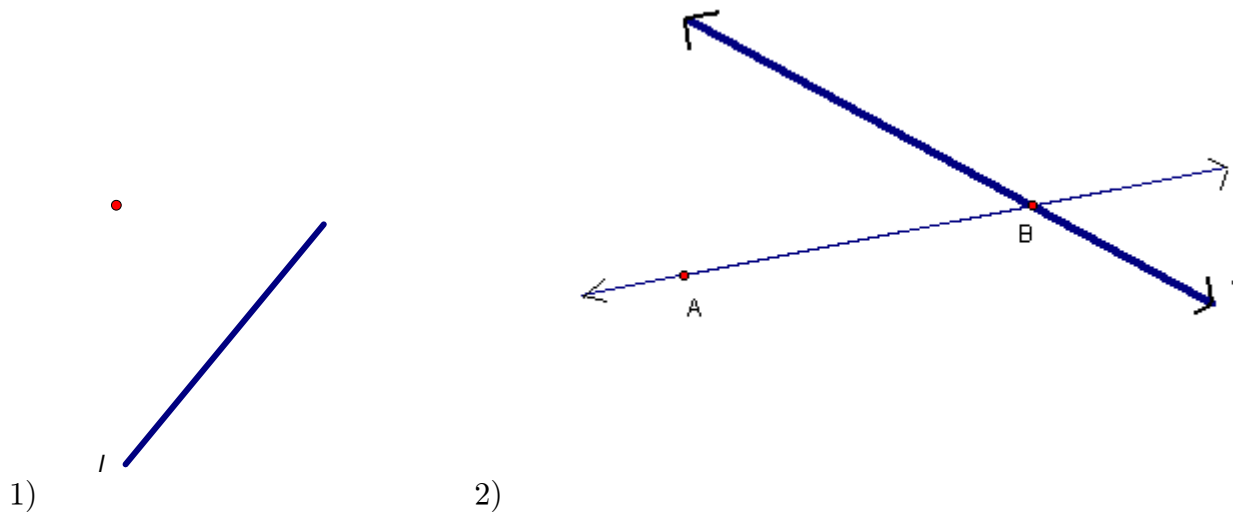
Use this method to reflect $\triangle QRS$ through line l :



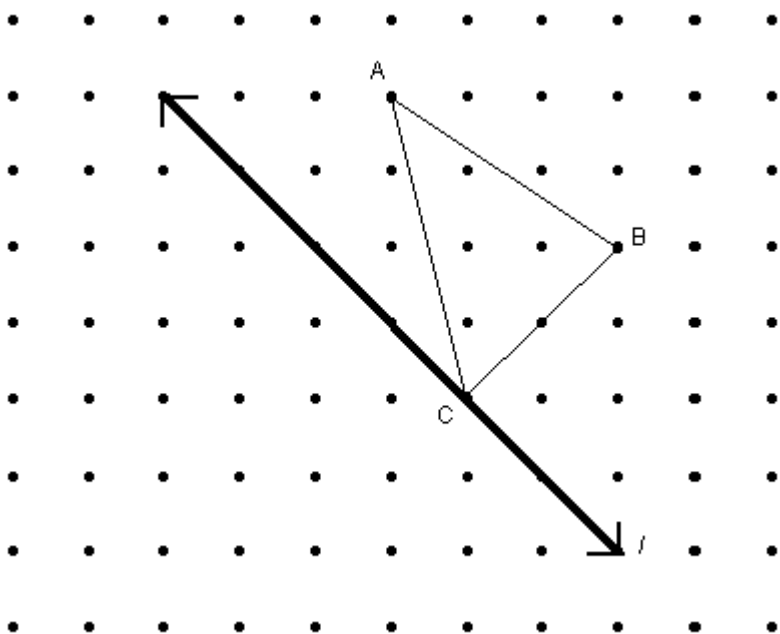
Compass and Straightedge Method To reflect a single point P through a line l , two steps are required:

- 1) Construct a perpendicular from P through line l .
- 2) Find the point on that perpendicular on the other side of line l that is the same distance from l that point P is.

We will try two examples. In the first, reflect point P through line l . In the second, reflect \overleftrightarrow{AB} through l .



It is often possible to find the reflection of a figure that is on grid paper by inspection. See if you can find the reflection of this triangle through line l :



A Glide Reflection is another type of isometry. It involves two phases:

DEFINITION OF A GLIDE REFLECTION: A glide reflection is a motion consisting of a translation followed by a reflection in a line parallel to the slide arrow.

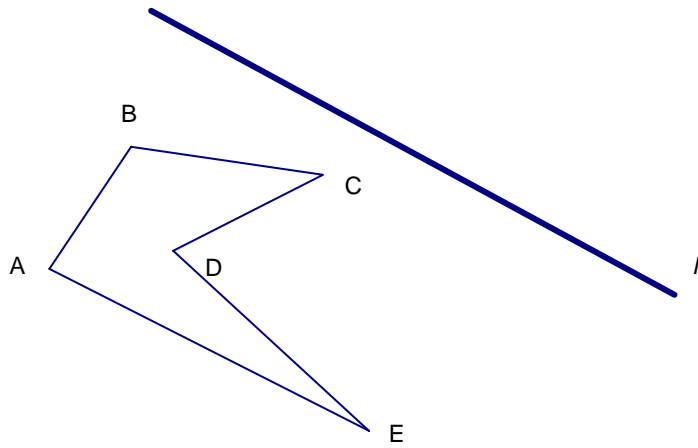
See figure 12-27 on page 851.

Then try Example 12-7 on page 852.

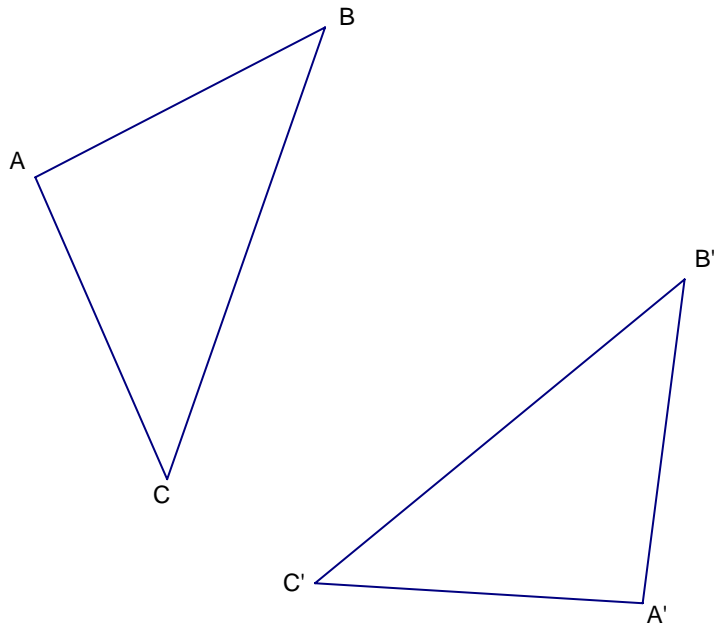
In groups, try the following three constructions:

Names:

1) Use the tracing paper method to reflect pentagon ABCDE through line l .



2) Use a compass and straightedge to find the line of reflection that produces the image $\triangle A'B'C'$ from $\triangle ABC$:



3) Use the dot paper to perform the glide reflection of $\triangle ABC$:

