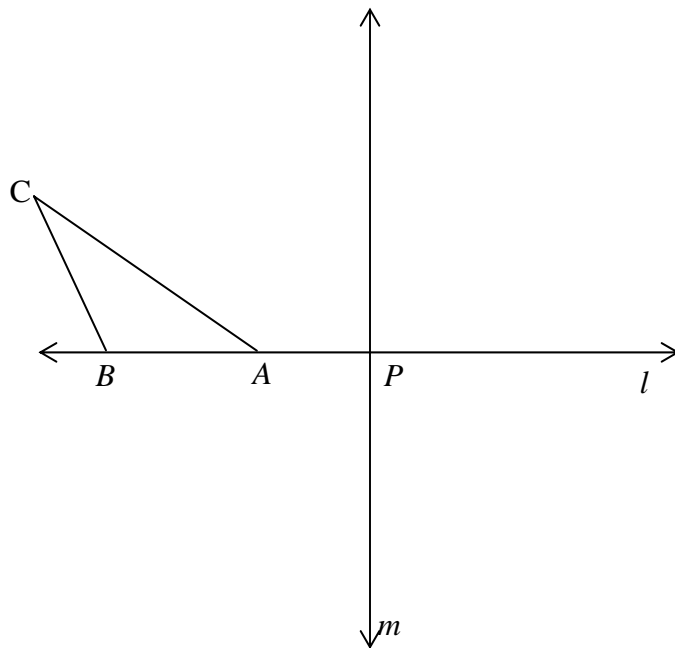


# A Second Challenge: Constructing a Reflection

In the drawing below, line  $l$  is perpendicular to line  $m$ . You can check this by folding the paper along line  $m$  and seeing that line  $l$  reflects upon itself. Can you construct a reflection of  $\triangle ABC$  using only Euclidean tools and line  $m$  as a line of reflection? Label the corresponding point for vertex  $A$  as  $A'$ ,  $B$  as  $B'$ , and  $C$  as  $C'$ .



- 1) Discuss exactly how you constructed the reflection and how you know it is a reflection. You might find it helpful to label the vertices of the reflected triangle and to use the following notations in your writing:

$AP$  means the distance from point  $A$  to point  $P$

$\overline{AP}$  means the line segment from point  $A$  to point  $P$

$\triangle ABC$  means the triangle with vertices  $A$ ,  $B$  and  $C$

$\angle A$  means the angle that has a vertex of  $A$

- 2) On your next construction, if you place the point of your compass on the line of reflection and the pencil of the compass on any vertex and construct a circle, the circle should pass through another point you have constructed.
- 3) Two geometric objects are congruent if you can reflect one onto another. Verify that your constructed reflection of  $\triangle ABC$  is congruent to  $\triangle ABC$  by folding your paper along line  $m$ .
- 4) Place your compass at point  $A$  and construct a circle that has a radius greater than the distance from  $A$  to  $P$ . Without changing the width, place the point of the compass at the point that is the reflection of point  $A$  and construct another circle.