

# Bisecting an Angle Using a Ruler

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Here is a simple way to bisect a given angle using the simplest and most familiar geometrical instrument: a ruler (see Figure 1). It works for any angle other than a straight angle (i.e., a  $180^\circ$  angle).



Figure 1.

While the procedure is simple to carry out, justifying it using the theorems of geometry may prove challenging to some students.

Here is the method. Given  $\angle ABC$  with vertex  $B$ , place the ruler so that one edge is aligned along ray  $BA$  and the opposite edge overlaps with the given angle. Using a pencil, draw a line  $m$  along the other edge; see Figure 2 (a). (For the vertex and line labels, please look at Figure 3; it depicts the construction schematically.) Next, place the ruler so that one edge is aligned along ray  $BC$  and the other edge overlaps with the given angle; draw a line  $n$  along

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the other edge; see Figure 2 (b). Let the lines  $m$  and  $n$  thus drawn intersect at point  $D$ . Then ray  $\vec{BD}$  is the required bisector of  $\angle ABC$ .

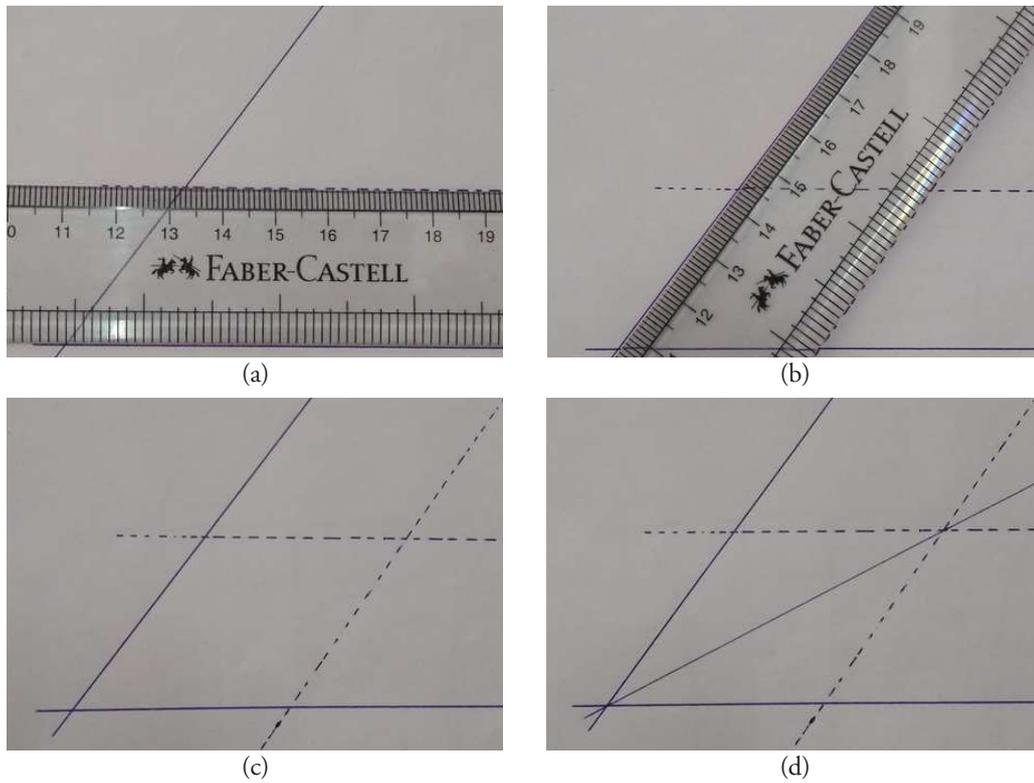


Figure 2.

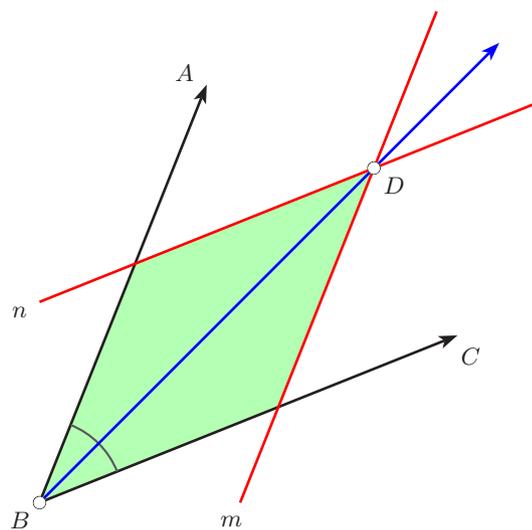


Figure 3. Schematic depiction of the procedure

The justification that the procedure works correctly is left as an exercise. A crucial geometrical fact that it draws on is this: *If two identical rulers are placed across each other, then the region overlapped by the two rulers is a rhombus* (see Figure 4).



Figure 4. A rhombus!



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