

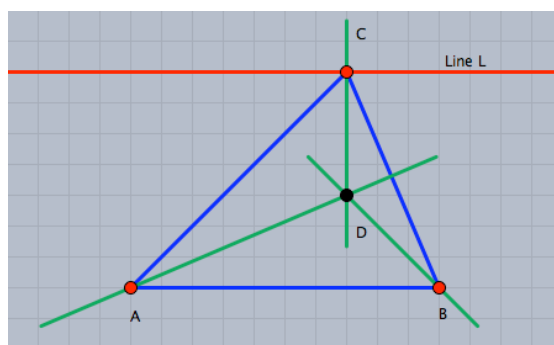
## Handout 7


### Animating and Tracing Loci Facilities of Cinderella

In this activity, you will experience the use of animating and tracing loci facilities of Cinderella to discover and generate geometric loci.

#### Student Activity:

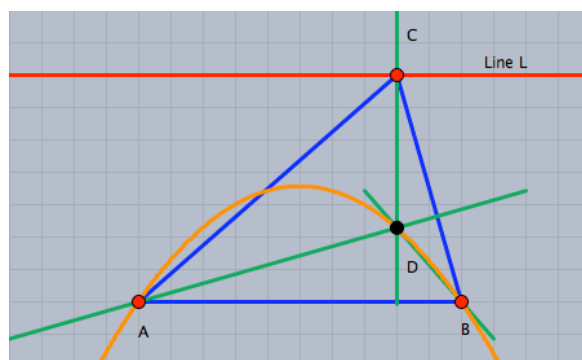
1. Construct a triangle ABC in a way that it is possible to move the point C along a straight line L, which is parallel to the base  $\overline{AB}$ .
2. Construct the three heights of the triangle ABC and generate their intersection point at  $D^2$ . Your construction should look like the following figure.




3. Move the point C along the straight line L, which is parallel to  $\overline{AB}$ , and observe the point D (the heights intersection point). Can you expect the locus of the point D, while the point C moves along the straight line L? In other words, which curve does the point D trace, while the point C moves along the straight line L? Make a conjecture?
4. The locus of the point D can be automatically generated using tracing a locus facility of Cinderella. For doing so, switch to **“Create a Locus”** mode by choosing the menu item **“Modes/special/loci”** or by clicking the button  in the toolbar. Afterwards, to generate the locus, three objects should be defined: the moving element, which is the point C; the road, which is the straight line L; and the tracer, which is the point D (the heights' intersection point). So choose the point C, then the straight line L and finally choose the point D. Within a second the locus will be automatically generated. After the locus is generated your construction should look like the figure shown below.

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<sup>2</sup> Remark: The heights of a triangle are concurrent. The automatic proving facilities of Cinderella can be used to show that, while you are generating the intersection point D.



5. Switch to **“Move”** mode and experience the locus when you move the point C along the line L.
6. Moreover, Cinderella has powerful animation facilities that can automatically move the point C along the line for you, and you do not have to move the point by your self. To generate an animation for the point C along the straight line L, switch to **“Animation”** mode by choosing the menu item **“Modes/Special/Animate”** or by clicking the button  in the toolbar. Then, two elements should be defined: the moving element, which is the point C and the road, which is the straight line L. So select the point C then the straight line L. After you have defined the animation an animation control panel with three buttons and a speed slide pops up in the lower left corner of the window.
7. Use the animation buttons with the speed slide to experience the locus of the point D when the point C is automatically moved along the straight line L.
8. Use Cinderella to elaborate the given situation by altering its conditions to discover and generate other geometric loci related to triangle.

*For example: the situation can be elaborated to discover and generate the locus of the medians intersection point of a triangle when a triangle vertex moves along a straight line. In this case, as shown in the figure below, the locus of the medians intersection point is a straight line, which is parallel to the road straight line.*

