

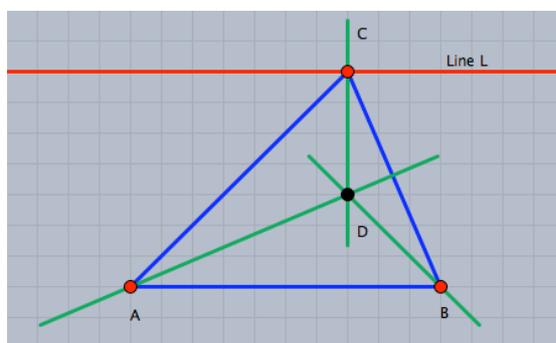
Handout 7

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.

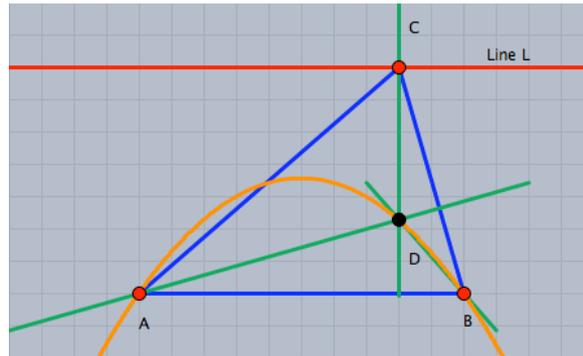
Student Activity:

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.

² 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.

