Hints 15-16

- 15.1. Compute in the upper half-plane (don't forget first to place the triangle nicely).
- 15.2. Use the same notation as in the proof of Pythagorean Theorem (see the figure below).
 - First, show that

$$\sin^2 \alpha = \frac{(2k\cos\varphi)^2}{(1-k^2)^2 + 4k^2\cos^2\varphi}$$

- Square the required expressions, express \tanh^2 and \sinh^2 through \cosh^2 and use the distance formula to get the latter.



Figure 1: Notation for Quesion 15.2.

- 15.3. Use the definitions of sinh and cosh as half-sum of two exponents.
- 15.5. Take one point on the given distance from the line and apply some isometries to get more points on the same distance.
- 16.2. Place your triangle in the Klein model in such a way that all altitudes will be represented by the altitudes of Euclidean triangle.
- 16.3. To compute, place the objects so that the required distance will be a length of the segment lying in the plane $z_2 = 0$, then everything is reduced to 2-dimensional problem.
- 16.4. Use formulae listed in 16.3.