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MAC-CPTM Situations Project

Constructing Parallel Lines

Prompt

During a geometry class for preservice middle school teachers, the students were asked to construct a line parallel to a given line through a point not on the line. After allowing for time to work and consult with classmates, the teacher asked for volunteers to share their constructions. One student proposed constructing a few circles with the same radius, tangent to the line, and connecting their "top points" as below. (Note: The radius measure was "maintained" by keeping the compass open the same amount, approximating the center, and then drawing the circles.)
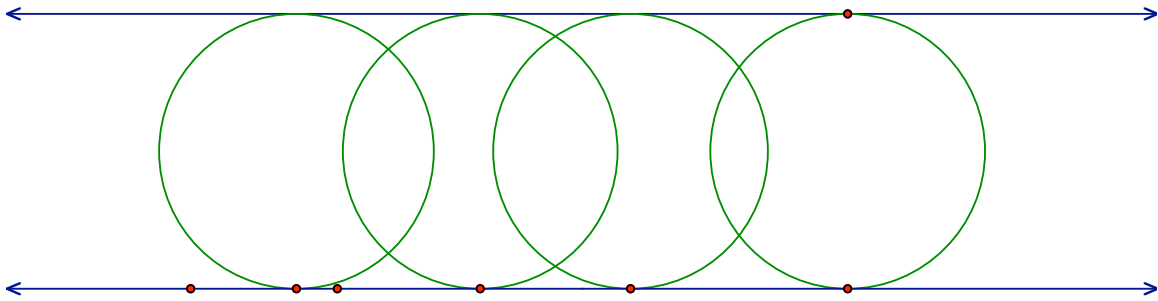
The professor then asked the student to justify the construction and to determine if it always works.

Mathematical Foci

Mathematical Focus 1

Idea: The first focus could address what types of actions are allowed in constructions and what counts as a true construction. Also, this focus might also look at the purpose of constructions. Although these are historical ideas, it seems that this knowledge would be useful for teachers in deciding how to proceed when their students propose constructions.

Mathematical Focus 2

Idea: The idea proposed could work, given a great deal more constructed objects. This focus would explore how to construct a parallel line through a point not on the line using the circle idea.

Mathematical Focus 3 / Post-Commentary

Idea: Provide the common construction for a parallel line and discuss how it reflects the ideas from Focus 1.

(The following construction shows the "why" and not just the construction marks.)

Construct a rhombus with part of the line as a side of the rhombus. Use a point on the line to the point P to create the radius of the circle to use. The side opposite the line will be parallel to the given line and we can draw a line over the segment.