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Plane geometry and trigonometry – related fields: do they work hand in hand?

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Summary: The purpose of this article is to illustrate the close relationship between plane geometry and trigonometry – two related, tangent fields in mathematics – using multiple solution methods for challenging problems that are usually solved using Euclidian geometry. Each problem is solved or proved by several geometric and trigonometric methods. Mathematics educators agree that linking mathematical ideas by using multiple approaches for solving problems (or proving statements) is essential for the development of mathematical reasoning, understanding and creativity. Providing teachers with support for the implementation of different problem-solving approaches is critical if classroom practices are to change. For this reason, the authors believe that providing mathematics teachers with a ready-made arsenal of specific tasks with a variety of solutions from different mathematical areas is essential. Following the review of the professional literature, and after conducting a case study that involved a course on this topic as part of a pre-service mathematics teacher education program (including student feedback via questionnaire and interviews), it was concluded that mathematics educators should be encouraged to introduce many authentic multiple-proof problems into their teaching program. In addition, the effect of such exercises on students' mathematical understanding and performance should be further studied.

Classification: G40 G60 D39
Keywords: problem-solving; multiple solutions and proofs; pedagogical methods; teacher education; geometry; trigonometry
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