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Deepening understanding of transformation through proof.

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From the introduction: An algorithmic approach to transformational geometry – one that omits rigorous proof – misses opportunities to connect the rigid motions to a host of other geometric topics. In this article, we revisit several familiar transformational geometry constructions with an eye to rigorous geometric proof. As we explore proofs of familiar transformational results, we uncover a variety of mathematical connections between the rigid motions and Euclidean geometry while modeling an approach that teachers can use to explore transformations in more depth with their own students. Moreover, we highlight the use of interactive geometry software, specifically GeoGebra, to explore questions that arise naturally from the study of transformational proofs. Technology affords us the opportunity to answer “what if not?” questions too often ignored in secondary school classrooms. Conjectures generated by the “what if not?” process provide new avenues for proof in our classroom.

Classification: G50 E50 U70

Keywords: transformation geometry; proving; congruent transformations; elementary geometry; line reflections; point reflections; rotations; translations; polygons; rigid motions; geometry software; computer as educational medium; problem posing