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Visualizing the arithmetic of complex numbers.

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Summary: The Common Core State Standards Initiative stresses the importance of developing a geometric and algebraic understanding of complex numbers in their different forms (i.e., Cartesian, polar and exponential). Unfortunately, most high school textbooks do not offer such explanations much less exercises that encourage students to bridge geometric and algebraic representations. The purpose of this article is to share Geometer's Sketchpad labs, where students can unearth a geometric interpretation of the arithmetic of complex numbers and their relationship to transformations. With dynamic technologies, students can discover that (1) addition and subtraction of complex numbers corresponds to a translation of the complex plane, (2) multiplication corresponds to a rotation and dilation of the complex plane, and (3) division of complex numbers corresponds to the composition of a reflection about the real axis and dilation of the complex plane. Furthermore, I illustrate how such activities may potentially enrich classroom dialogue.

Classification: F50 U70
Keywords: arithmetic; complex numbers; geometric representation; algebraic representations; use of technology; visualization
http://www.researchinformation.co.uk/timearch/2014-03/pageflip.html