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Identifying a framework for graphing formulas from expert strategies.

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Summary: It is still largely unknown what are effective and efficient strategies for graphing formulas with paper and pencil without the help of graphing tools. We here propose a two-dimensional framework to describe the various strategies for graphing formulas with recognition and heuristics as dimensions. Five experts and three secondary-school math teachers were asked to solve two complex graphing tasks. The results show that the framework can be used to describe formula graphing strategies, and allows for differentiation between individuals. Experts used various strategies when graphing formulas: some focused on their repertoire of formulas they can instantly visualize by graphs; others relied on strong heuristics, such as qualitative reasoning. Our exploratory study is a first step towards further research in this area, with the ultimate aim of improving students' skills in reading and graphing formulas.

Classification: I20

Keywords: graphing formulas; recognition and heuristic search; mathematical expertise

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