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Mathematical reasoning and observing transformations of diagrams.

Bergsten, Christer (ed.) et al., Mathematics and language. Proceedings of MADIF4, the 4th Swedish mathematics education research seminar, Malmö, Sweden, January 21–22, 2004. Linköping: Svensk Förening för MatematikDidaktisk Forskning (ISBN 91-973934-2-8). Skrifter från Svensk Förening för MatematikDidaktisk Forskning (SMDF) 3, 7-19 (2004).

The crucial role of diagrams in mathematical reasoning is the focus of the plenary presentation. Recognising that diagrams of many different kinds are ubiquitous in mathematics, and that reasoning often deal directly with the transformations of diagrams, building on their structural properties and often rule-governed transformations, rather than with abstract ideas involved in mathematical concepts, the character and relevance for mathematics education of Peirce's notion of diagrammatic reasoning is outlined. This points to the importance of perspective aspects of mathematical thinking. Diagrammatic reasoning is used to solve tasks, to be distinguished from a representational use of diagrams. By offering examples from elementary arithmetic, and from linear and abstract algebra, the author highlights the power and usefulness of different kinds of diagrammatic reasoning.

Classification: C30 E40 D50