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Inversion in mathematical thinking and learning.

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Summary: Inversion is a fundamental relational building block both within mathematics as the study of structures and within people's physical and social experience, linked to many other key elements such as equilibrium, invariance, reversal, compensation, symmetry, and balance. Within purely formal arithmetic, the inverse relationships between addition and subtraction, and multiplication and division, have important implications in relation to flexible and efficient computation, and for the assessment of students' conceptual understanding. It is suggested that the extensive research on arithmetic should be extended to take account of numerical domains beyond the natural numbers and of the difficulties students have in extending the meanings of operations to those of more general domains. When the range of situations modelled by the arithmetical operations is considered, the complexity of inverse relationships between operations, and the variability in the forms that these relationships take, become much greater. Finally, some comments are offered on the divergent goals and preoccupations of cognitive psychologists and mathematics educators as illuminated by research in this area.

Classification: E40 C30 F30

Keywords: inversion; arithmetic operations; psychology and mathematics education

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