

Using Real Objects and Manipulatives to Solve Problems: A Focus on Factoring Quadratics

The Importance of Using Manipulatives to Solve Mathematical Problems

- The Texas Essential Knowledge and Skills for Mathematics process standards expect students to use appropriate manipulatives in order to solve real world problems
- Concrete objects (or manipulatives) can help reinforce students' understanding of abstract mathematical concepts
- A graduated instructional sequence called the *Concrete-Representational-Abstract* (CRA) is a powerful method demonstrated to help struggling students grasp abstract mathematical concepts
- Since *all* students in the classroom have different learning styles (kinesthetic, tactile, visual, writing, auditory), this method can be beneficial to all students, not only those who struggle

The CRA Method

Concrete

- Using manipulatives or models
- Learning by doing

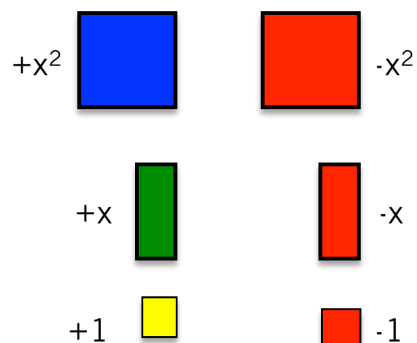
Representation

- Using visual representations like pictures/graphs
- Learning by visualizing

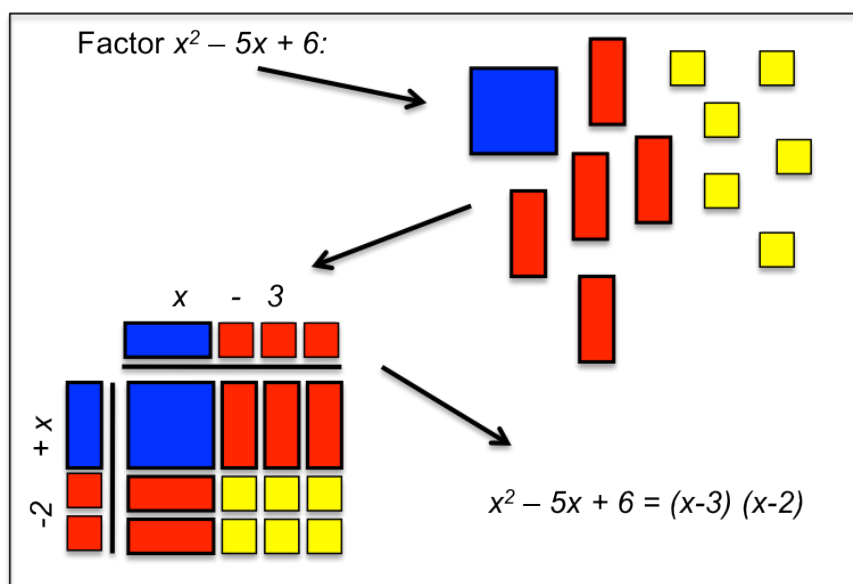
Abstract

- Using abstract mathematical notation
- Learning by translating

Algebra Tiles



The CRA Method: An Example of Factoring Quadratics



Examples of the CRA: Beyond Quadratics

- Calculating slope (on floor tiles; on graphs; using equations)
- Calculating speed (matching graphs by walking/running; graphing, equations)
- Calculating drip rates/fill rates – experiments/graphing, equations

Contact Information

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