

## Expanding Using CAS

by – Patricia Kehoe

### Activity overview

*This is a group work activity that allows students to use the CAS capabilities of the TI-Nspire to explore patterns emerging from the product of two binomials.*

### Concepts

*Product of two binomials*

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### Teacher preparation

This activity allows for the class to be divided into six groupings. The teacher provides each group with a TI-Nspire Expanding Instruction Card, an overhead copy of the worksheet and an overhead marker. Each student in the group will be provided with an overall summary sheet and one of six different expanding worksheets

### Classroom management tips

Depending on the exposure students have had to the TI-Nspire technology, the teacher could choose to demonstrate the skill of expanding using the TI-Nspire Expanding Instruction Card as a reference. An overview of the procedures would be helpful for students. Each group will work together to complete their activity sheet. One person in the group transfers their findings onto the overhead sheet and one person should be ready to present their findings to the class. As groups present each student will record the results on their own summary sheet.

### TI-Nspire Applications

*TI-Nspire CAS, calculator platform, expanding capability*

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### Step-by-step directions

This lesson should support earlier work done in the unit with algebra tiles which provide students with an opportunity to represent abstract mathematical ideas in visually rich ways. Use of the TI-Nspire calculator helps reduce the time spent on routine tasks to allow students to devote more of their efforts to thinking about emerging patterns and developing the rules for expanding binomials.

The teacher provides each group with a TI-Nspire Expanding Instruction Card, an overhead copy of the worksheet and an overhead marker. Each student in the group will be provided with an overall summary sheet and one of six different worksheets.

The teacher starts the lesson using an example of expanding using algebra tiles. This helps students make the link between pictorial models looked at previously and the algebraic ones to be used in today's activity.

Each group will work together to complete their activity sheet. One person in the group transfers their findings onto the overhead sheet and one person should be ready to present their findings to the class.

The teacher chooses the group with Worksheet #1 to present their findings. As the group presents all students listen, ask questions and record examples on the Expanding Summary Sheet.

This process is repeated with the other 5 worksheets.

This activity could be spread over two days. Worksheet #1-3 could be reported on during the first class and then students would have an opportunity to practice before the next day when they would explore special cases of the product of two binomials (worksheets # 4-6).

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#### Assessment and evaluation

- *This activity is not intended to have an immediate evaluation component as students are in the midst of a unit exploring multiple representations of expanding polynomials.*
- *An exit card strategy could be used for the teacher to judge how well individuals grasped the overall rules for expanding two binomials.*

#### Activity extensions

- A similar format can be used to explore factoring trinomials

#### Source

*This lesson was adapted for TI-Nspire from materials produced in collaboration with mathematics consultant Tom Steinke and the Mother Teresa High School Mathematics Department in Ottawa, Ontario, during their Lesson Study Project 2006.*

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#### Student TI-Nspire Document

*Instruction Card, Worksheets, and Summary sheet are all contained in the document:*

***Expanding Using CAS Student***