Common Denominator
ID: 10986

Activity Overview
*In this activity, students will use an interactive model that multiplies the fraction by "1" to help determine the common denominator. Then they will use what they have learned to add and subtract fractions without the same denominators. As an extension, they will use the **LCM** command to quickly obtain the best denominator to complete the operations.*

Topic: From Arithmetic to Algebra
- *Adding and Subtracting fractions*
- *Common denominators*

Teacher Preparation and Notes
- *If an interactive white board is available, create some fractions and their physical representations using circle pieces or rectangular pieces, and then divide them up so that there is a common denominator.*
- ***To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter "10986" in the quick search box.***

Associated Materials
- *CommonDenominator_Student.doc*
- *CommonDenominator.tns*
- *CommonDenominator_Soln.tns*

Suggested Related Activities
To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.
- *Visual Fractions Exploration (TI-73 Explorer with TI-Navigator) — 8652*
- *Adding and Subtracting Fractions (TI-73 Explorer with TI-Navigator) — 8172*
- *Fractions Number Line (TI-84 Plus family) — 2507*
- *Names for 100 (TI-15 Explorer) — 5701*

Problem 1 – Finding a common denominator

Before beginning a couple questions to discuss with students are:

- What is the difference between the least common denominator and a common denominator?

- Is there more than one possibility for the common denominator? Explain.

On page 1.3 is an interactive model that creates an equivalent fraction. Students are asked to change the fractions, $\frac{2}{3}$ and $\frac{1}{4}$, so that they have a common denominator. They need to change the "1" fraction by clicking on the up or down arrows to the right of the fractions. The equivalent fraction is updated each time the arrow is clicked.

You may need to give details to students as to why the top and bottom of the fraction are multiplied by the same number. Explain that they will get an equivalent fraction, or a fraction that names the same number.

Students are then asked to change three more pairs of fractions. To change the fractions on page 1.3, students need to double click on the numbers in the first fractions only and then edit the numbers.

They should see that the *least* common denominator is a product of the two denominators.

Students will then change the fractions given on page 1.6 using the interactive model on page 1.3. They should see that for these pairs, the fractions are multiplied by a different number than the other fraction's denominator.

Students should understand that the original denominator of the fraction is a factor of the common denominator.
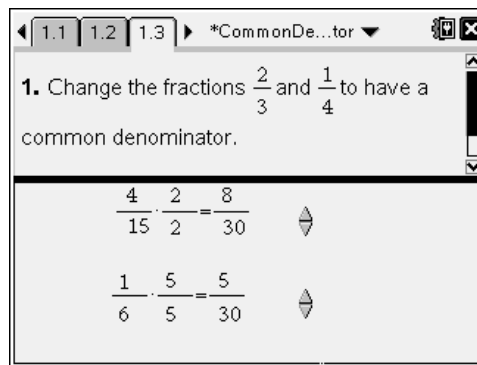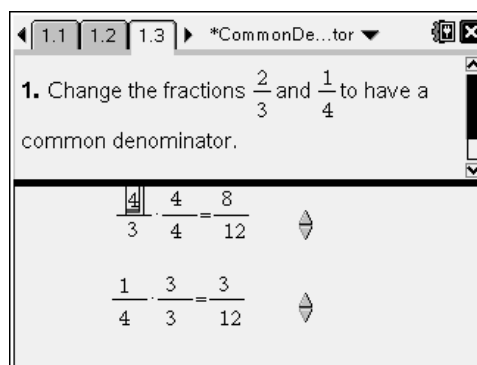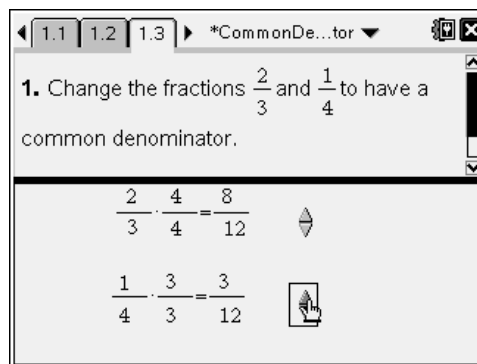
Problem 2 – Adding and subtracting fractions

Students are asked on page 2.1, for which operations need a common denominator. This is a multi-select question and is not self-check.

You may want to discuss with students why they must have a common denominator to add or subtract two fractions, but not to multiply or divide two fractions.

Students are to then explain how to add or subtract two fractions with different denominators on page 2.2.
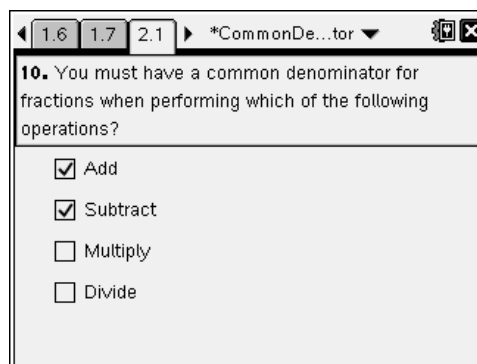
Pages 2.4 and 2.5 are set up the same way, but the first one is for adding and then second one is for subtracting. Students are to use the arrows to change the fractions so that they have a common denominator.

Then they need to use the double click on the fraction bars at the bottom of the screen and enter the equivalent fractions in the correct space. They should then add (mentally) the fractions with the common denominator and complete the equation.
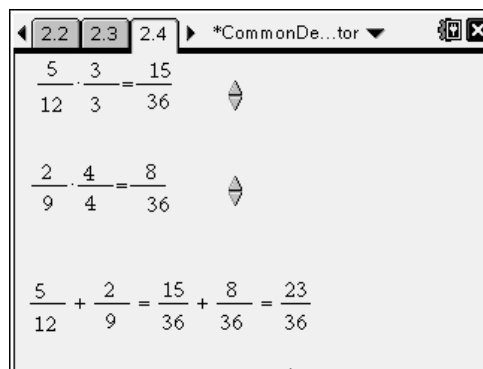
Extension – Finding the least common multiple

Students often rely on the product of the two numbers as the "best" denominator for any fraction addition problem. The **lcm** command may surprise them sometimes with its result! They can type the command in the **Scratchpad** using the alpha keys or press **MENU > Number > Least Common Multiple**. Students must be able to use the information from the LCM to create the new equivalent fractions before adding or subtracting.

Have students use the fractions from page 1.6 or problems from their textbook/resource.

You may want to have a discussion on how prime factors are used to create the least common multiple.