Basic Algebra with a CAS
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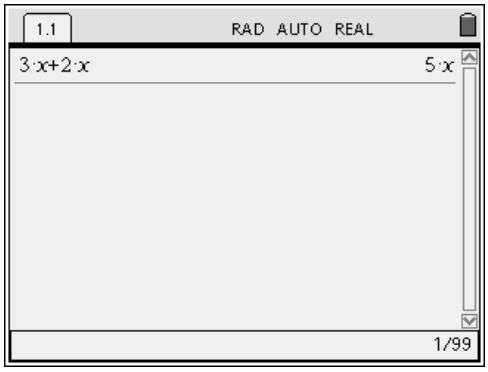
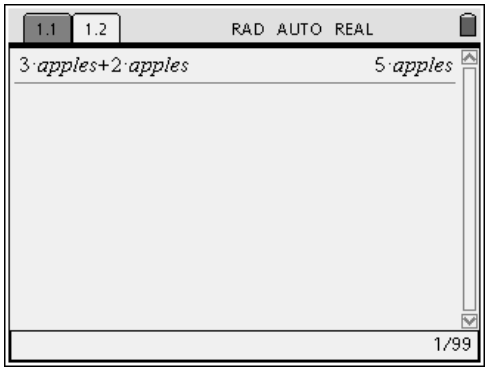
During the last few years of my teaching career, I had the opportunity to use CAS devices at my last three schools. Over time, I developed a pattern of teaching that benefited students learning basic algebra. Although I cannot adequately represent it here, all of the work that is shown was supplemented with algebra tiles, and I worked with tiles wherever possible.

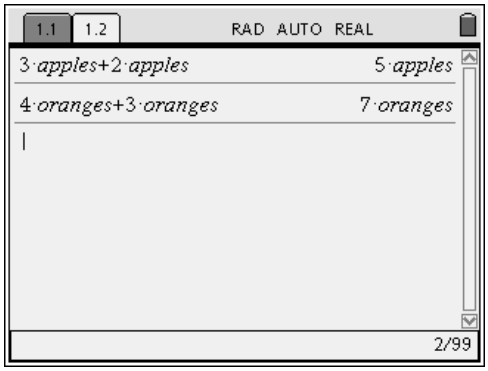
In this article, let's look at the very basics of algebra, adding like terms. An activity such as the one shown to the right is good for several reasons. First, kids will accept the answer since a technological device produced the result. Second if you can get kids to accept the answer, this exercise can be turned into a communication problem – "Can you explain how the calculator produced this answer?"



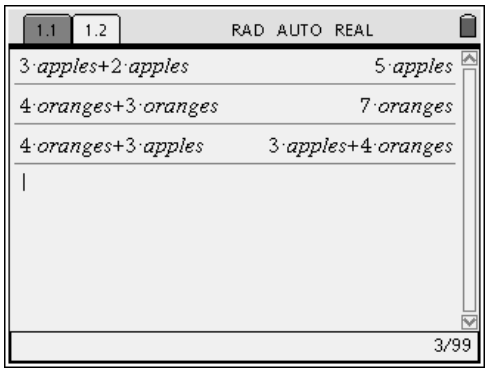
However, we can do even better. Let's try starting with the screen to the right. In this example, the variable is "apples" rather than a single letter. The statement makes sense to students seeing this for the first time since it is in a context that they understand. The only drawback is that the device adds in the dot representing multiplication and we may need to take a moment to explain this.



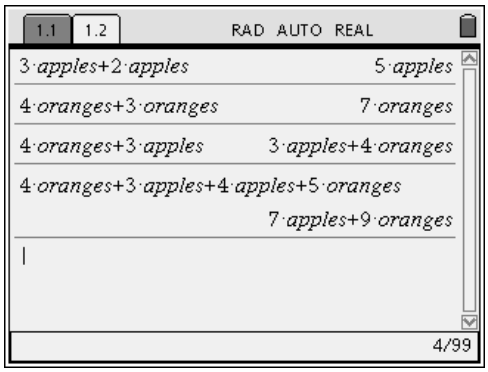
We can also try another "variable". In this case, "oranges" has been used for this purpose.



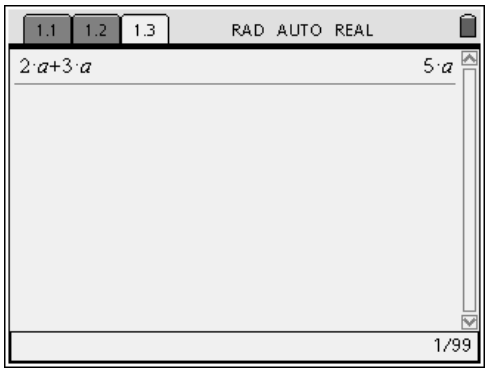
Mixing variables does not make a lot of sense to kids, just as it shouldn't when looking at an algebraic expression. It's amusing when the students almost become indignant that we'd ask such a question. At the same time, they have recognized the idea of like terms.



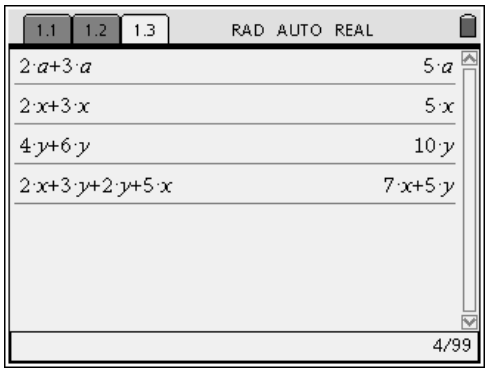
This type of example also makes some sense to them and reinforces the idea of like terms.



By this point in time, I'm hoping that at least one student is getting tired of typing in the words "apples" and "oranges". If this happens, I can offer to be a nice guy and ask if they'd like to allow one letter to represent a variable, say "a" for "apples". Now, we have come full circle. We're back to the type of expression that we started with in the first screen, but now, the expression has a context that the students understand – and they think that they've gotten away with something by asking for the shortcut.



I can continue my lesson as I might have in the beginning using whatever variables I wish. However, now there is a basic understanding that each letter stands for some quantity that can be defined by the student.



Since someone is going to ask, the device cannot distinguish between the plural and singular of a “variable”. The answer is “no, it cannot”. Let’s not expect too much!