A double whammy: Algebra with fractions!

Elizabeth Burns

Loreto Mandeville Hall, Vic.

The purpose of this short introduction is to open up discussion and sharing on this perennial issue in high schools. In particular, we are hoping that AAMT members will share the sorts of mistakes their students make. A few samples follow.

Three quarters

At the early stages of working with fractions, Debbie did this:

The value of $\dfrac{3x}{4}$ when $x = 5$ is $\dfrac{35}{4}$.

She could substitute correctly in cases without fractions (e.g. the value of $3x$ is 15 when $x = 5$) but having the fractions just seemed to make her panic!

Same or different

The formula for area of a triangle is usually introduced as being:

$\dfrac{1}{2}$ base × perpendicular height.

When students encounter the more streamlined version $\dfrac{\text{base} \times \text{height}}{2}$, there seems to always be at least one student who wonders whether these are different. Often they believe they *are* different!

Pi in the sky

Although not 'algebraic' in nature, there are all the issues and problems students have when they encounter radian measure and have to understand and work with fractions that involve π (e.g. what is $\dfrac{\pi}{2} - \dfrac{\pi}{3}$ etc.). These fractions contain numbers other than numerals, and cause many headaches for many students.

Readers will probably recall a few of these sorts of misconceptions. You might like to indicate what you think is going on in the students' head and/or the way(s) you try to help students move forward. Others are welcome to share their thoughts on the matters raised by the examples: alternative interpretations, different strategies, etc.

A collection of student misconceptions that is annotated with some thoughts about what is going on and what teachers might do about them will be useful in its own right. We may even be able classify the misconceptions to create a useful schema. It is not beyond the bounds of

imagination that the product of this discussion will be a paper that can be published — and everyone who contributes will be an author!

To manage the process and make it as inclusive and participatory as possible, we would like people to abide by the following *Rules of Engagement*. Please:

- give the examples you send a name (as above) — this will give us a shorthand for talking about them

- send only one or two examples at a time — we want lots of people to contribute, so if someone provides a list of 76 examples first up it will diminish involvement considerably.

- remember that, in the text only format of this bulletin board, fractions and algebraic expressions tend to look ugly and can be difficult to read.

Click here to join the discussion on the AAMT Bulletin Board