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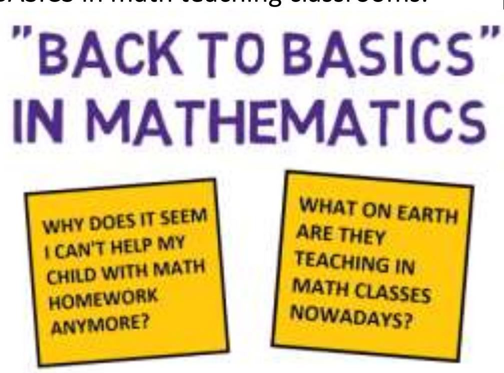
TANTON'S TAKE ON …

FAMILIARITY

NOVEMBER 2015

This essay is the transcript to a four-minute video I recently made in response to the virulent calls to BRING BACK THE BASICS in math teaching classrooms.



The video can be found at www.jamestanton.com/?p=1794 and is fun to watch. I suggest you view the video rather than read this transcript!

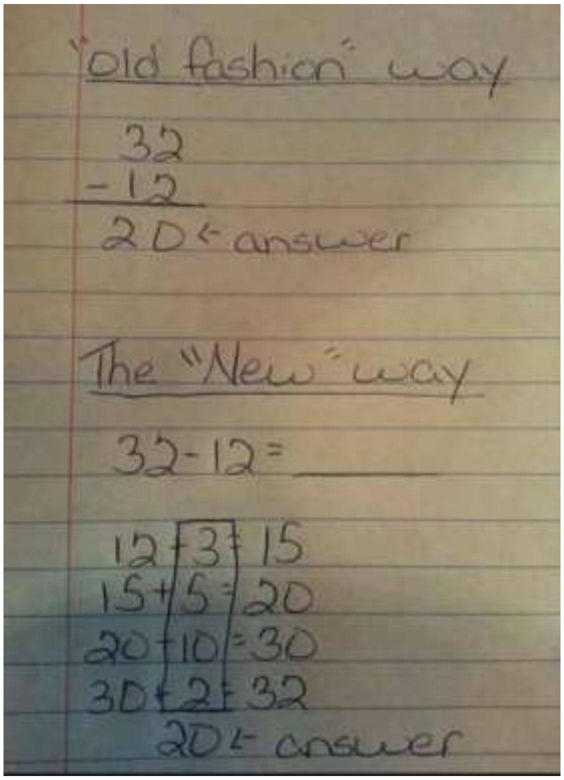
G'Day:

There's a call across the U.S., with the implementation of the Common Core State Standards, and a call in parts of Canada too with their curriculum reforms, to GO BACK TO BASICS, to take mathematics learning for our kids back to what it should be, the mathematics we know and the mathematics we recognize.

What we see going on in classrooms, at least with what our kids bring back home to us, seems strange to many, if not bizarre, if not absurd.

The exemplar of absurdity making the internet rounds is this example, showing how to compute 32 – 12 the old fashioned way, and how to compute it the new way.

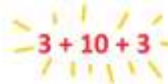
One can only look at this page and say EGAD! I agree. 32 – 12 is just 20 after all.

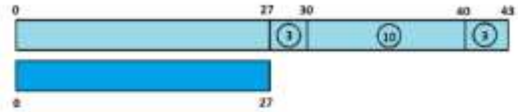


We see the familiar traditional algorithm in this image. The image is a call to go back to the traditional ways. But we as adults have to be really clear as to what we want for our kids, what learning really means. The traditional algorithm certainly feels like learning to us because it is familiar.

So let me talk about this example, and what's really going on in our classrooms today. But let me work with numbers that have some meat to them. Let's do 43 – 27, say.

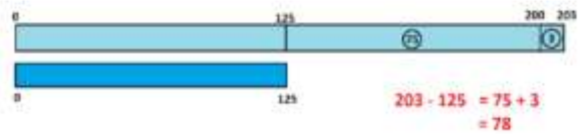
Here's how my brain works. When I look at $43-27$ I think "3 and 10 and 3" to get the answer 16. Actually, I <u>see</u> this answer in my mind. I see a pair of rulers, side by side.





Put a 43 inch ruler and a 27 inch ruler next to each other and we just see that their lengths differ by three inches, and ten inches, and three inches. My brain naturally chunked the difference into three pieces: 3 and 10 and 3. The difference is 16.

And maybe you can see how to do this one: 203 – 125.



Put two rulers side-by-side and see that 75 inches and 3 inches gets you from 125 to 203. Thus 203 – 125 must be 75 and 3, that's 78.

Whoa! This is clever problem solving. This is smart clever thinking.

However, I wasn't taught this mode of thinking in school. Back in my day, if I were asked as a youngster to compute $43-27$ in a worksheet, I was expected to write the following (thereby demonstrating that I was fully "showing my work"):

$$\begin{array}{r} {}^{3}\not{4}{}^{1}3 \\ -\ 27 \\ \hline 16 \end{array}$$

This algorithm is very familiar to us adults, and it is hard for us to distance ourselves from it to see how bizarre it really is at face value because we are so familiar with it.

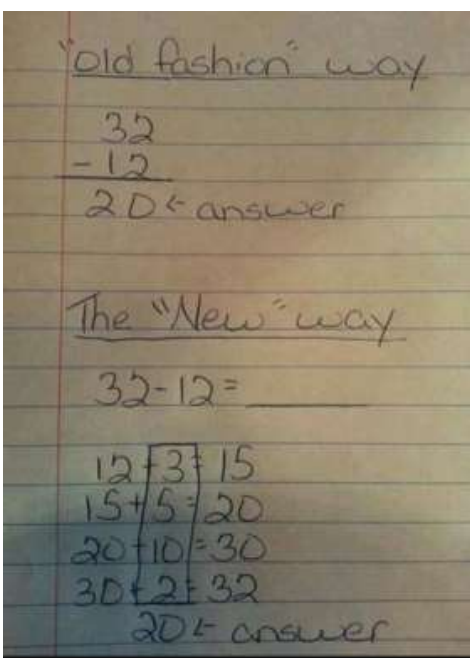
Again, we often equate familiarity with understanding.

Yes, of course, we can unpack the algorithm and make sense of it, explain why we work from right to left (even though we are taught to read left to right in life), and why changing "3" to thirteen is valid if we also change the "4" to three, and why doing this carrying is helpful in the first place.

But I see what's going on with rulers. I have to work to unpack what's going on with the traditional algorithm.

Another point: Is it even important for our children to do the traditional algorithm in this day and age? If the goal is to reliably get answers to subtraction problems, then the best and most appropriate means to achieve that goal is … to pull out one's smartphone! We can't be teaching just for the sake of getting answers anymore. We must be teaching for thinking and understanding and developing the skills and confidence to just "nut your way" through problems.

So back to this image:



Can you make sense of the image now, what the "new way" is doing? Of course, the author of this script chose an absurdly straightforward subtraction problem to begin with. And requiring a student to write out such absurdly detailed steps is, well, absurd. But can you see the thinking in the "new way" nonetheless? I'd argue that it's harder to see thinking - not just the procedural doing - in the "old way."

We adults really do fall into the trap of equating familiarity with understanding.

We're teaching mathematics now with understanding.

And by the way, students do still learn the traditional subtraction algorithm. It is now pushed much later in the curriculum, discussed only when firm understanding of what subtraction is and how it can be computed is fully explored. The traditional algorithm is then seen, by one and all, as a shortcut, pen-and-paper method codifying all that understanding, and, moreover, it is offered only as one of many possible options for computing subtractions. After all, why on Earth would I do $43-27$ via the algorithm when the answer is so visually obvious?

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