Go Ahead – Break 'Em
The Rules, that is
"Uncle Bob"

There are many instances in performing operations in arithmetic when you can benefit by not following the lock-step methods you were taught in school. If you have your math wits about you, then go ahead and break some rules!

Example One: Subtract without borrowing 370 – 147. If you know that subtraction is not just "take away," and the answer is not just "what's left," but it is also the distance from A to B, and also the difference between A and B, then there is no need to borrow in the usual way. The difference between 370 and 147 is the same as the difference between 373 and 150, and we can see it right away: 223. By changing one of the numbers to a "friendly" number and adjusting the other by the same amount, you keep the distance the same.

Example Two: Add from left to right 668 and 354. Lots of students in this and other countries do it this way. It puts the emphasis on the important places. On the left sides we see 600 + 300, so the sum will be 900 or possibly 1000 plus. Taking each place on its own we have sums of 900, 110, and 12, and the problem looks easier already. The first two partials sum to 1010 and another 12 makes 1022.

Example Three: Without the lowest common denominator, add 11/12 and 4/15. I know, you don't DO fractions. Well, futzing around trying to find the LCD (lowest common denominator) may be one reason you've resisted. The denominators 12 and 15 have a product of 180 and it is a perfectly usable common denominator. Not only that, but in Algebra I, you often will be forced to use the product of denominators, as in the sum

$(a/b) + (c/d)$ which is $[(ad + bc) / bd]$.

Note the product bd. Back in the arithmetic example, we use the formula above to get

$(11 \cdot 15+12 \cdot 4)/180$

The sum is then (165 + 48)/180 or 213/180. Now, defy anyone who wants you to change that to a mixed number. They are the work of the devil!

Example Four: Divide Fractions Straight Across? Why is it easier to multiply fractions than to divide them. The only difference in the algorithm (method) is that to divide you are instructed to "invert" before you multiply straight across.

Invert what? And how do you invert two and two-thirds? We can't show you ways to avoid all the pitfalls of working with fractions, but we thought you'd like to know that the invert thingie is not always necessary, and that dividing straight across is not illegal, it's just often very inefficient. The devil here is in the details.

Divide (8/9) by (1/3). Not a tough problem, right? Try dividing straight across. The quotient (we think) is 8/3, eight thirds. Have we done math dirt? The traditional way would have us invert 1/3 and multiply straight across, and that gives us 24/9, and in one more step 8/3. We have agreement!

Now here’s why we recommend you listen to your teacher on this one. Dividing straight across can lead to a horrendous mess. A problem as simple as 1/2 divided by 3/8, by inverting, equals 1/2 times 8/3. Answer: 8/6 or 4/3. But dividing straight across gives us 1/3 divided by 2/8 and we have more division to do. In problems with mixed numbers, gahrr, it gets many times worse.

OK. Break the rules, but know what you are doing and whether and why it makes sense.

Cheers, Uncle Bob.