Thirteen Extraneous Algebra II Topics

By Lane Walker

1. Rational functions should be limited to numerators of degree at most one and denominators of degree at most two. Radical functions are limited to "simple" square roots or cube roots of at most, quadratic polynomials. *See Common Core State Standards for Mathematics A.REI.2 and Appendix A, page 36.*

2. Synthetic division: Students who learn synthetic division often see it as superior to long division and choose to forego the work to understand either. In the course of learning to add registers of numbers, they get confused in long division where they have to subtract instead. Synthetic division is specifically called out in the Algebra Progression Standards, page 7.

3. Rationalizing denominators: While it is a good idea to familiarize students with equivalent forms and converting to decimals, the laborious process of rationalizing fifth roots and binomial denominators is not there.

4. Complex numbers: Operations beyond basic adding, subtracting, and multiplying of complex numbers are + standards in CCSS, recommended for courses beyond Algebra 2. Division of complex numbers is generally accomplished in high school through the process of rationalizing denominators and is only addressed in the + standards.

5. Laws of exponents or simplifying rationals do not need to include simplifying heinous cases for the sake of non-contextual exercises:

$$\left(\frac{a^3b^2 \cdot 2a^2b^{-4}}{b^{-1}}\right)^3 \qquad \frac{\frac{1}{5} - \frac{5x}{3}}{\frac{x^2}{5} + \frac{x^2}{9}}$$

   Examples of tasks for exponents (N.RN.a.1) are at Illustrative Mathematics here.

6. Rational Root Theorem

7. Descartes Rule of Signs

8. Absolute value inequalities (Inequalities are treated with a light touch in CCSS.)

9. Compound inequalities with an emphasis on "and" vs. "or." These are best studied within the context of set theory.

10. Finding the inverse function of a function. The functions progression document explains why.

11. Plus standards (+) from the Common Core if they are being included at the exclusion of modeling exercises

12. Tricks that help students avoid understanding the concepts behind the procedures: nixthetricks.com and 13 Rules that Expire.

13. Reteaching previous standards. While all skills and concepts K-11 should be, ideally retained, retention should be reinforced at increasingly sophisticated levels. Modeling problems offer opportunities to stretch students' abilities to analyze rich problems while, at the same time, revealing gaps in prior learning which can be addressed on an individualized basis.