

## Math 95 Instructor Notes

Math 95 is roughly equivalent to Algebra II. In the past, this has been taught mostly as a procedural course. However, this does not seem the best way to address the needs of our students. Students who take 105, 111, or other courses that 70 and 95 are preparing them for need a better grasp at modeling, understanding, concepts as well as the procedures in order to succeed. It is our job to make sure they have all of the tools needed.

Here are some guidelines to help facilitate deeper learning:

- Calculators are not appropriate for some quizzes and exams in Math 95. We don't have a blanket policy banning them but students often use the calculator at a crutch. Many of them look for teachers that will allow them to use the calculator so they never grow any confidence working without. However, some of the later material such as quadratics can benefit from the use of calculators. For this reason, I sometimes opt for an exam that is part calculator and part not. Other time, I just leave the calculator problems for lecture and keep the exam non-calculator. The main issue at this stage is students relying too heavily on their calculators.

It is possible to have tests that have some calculator sections and some non-calculator sections. This is useful especially if you want to ask some questions that are not numerically nice but are more accurate to real life. Questions that do not allow calculators should not be so computationally heavy that they lose the focus of the questions or are unreasonable to do in a short exam period.

Please, have at least a few quizzes and one exam with non-calculator portions.

For me personally, I allow only **scientific** calculators on quizzes/exams that allow calculators and might use DESMOS for presentations in class. The reason for this is I don't want to students who can't afford a graphing calculator to have less tools available to them than the students that do have one. A scientific calculator at least levels the playing field.

- Ask students to engage in mathematical modeling. ALEKS focuses a lot on the computational which allows us more freedom in our lectures to focus on the deeper ideas and their real world applications. Many worksheets for this purpose have been written and placed in the Math 95 dropbox. If you are not yet on the dropbox, please email me at [tnezol@uoregon.edu](mailto:tnezol@uoregon.edu) and I will add you.
- ALEKS is our online homework tool that adapts to the individual user. I have a course already created if you want to copy mine.
- The number of topics in Math 95 is less than in recent years. Last year we began a new curriculum

with fewer topics and more depth. Use this opportunity for plenty of review and opportunities to practice modeling (especially interpreting).

- Typically Math 95 consists of 2 midterms and 1 final. I give a quiz each week.
- I recommend you take attendance and make it a small percentage of their grade. Math 95 students often concentrate on their credit-bearing classes and stop coming unless they have motivation.
- Many of your Math 95 students will think they know most of the material and not understand why they were placed in the class. Provide sufficient amount of real world applications and conceptual learning to help these students move past the same errors they have likely been making their entire math lives.
- Many of your other Math 95 students have struggled their entire lives and are nervous. Allow them time to learn the material. I find in-class worksheet and homework time is useful in Math 95 as the time is plenty and the need for help is great.
- If you have any other questions, please don't hesitate to contact me.

The curriculum for Math 95 is on the syllabus. Here are some notes to identify some of the focus of the course:

- Lines: We returned lines to 95 because many students do not take 70 and have no basis in lines when they go to 111. This means that many of our 95 students were struggling in 111 from not having basic tools needed for success. We now spend a few days reviewing lines.
  - ALEKS will focus on the computational side of lines. This should allow you lecture time to focus on their meaning.
  - Have students interpret points and slope regularly throughout the entire term. Don't leave it just to these few days.
  - Start with the meaning not with the computations. Talk about what slope is, what a point is, and what an intercept it using examples from the real world.
  - You don't have to cover it all in class. ALEKS has videos and this is a review section.
- Quadratics: We review some factoring. Students should already have some foundation in factoring but most are not able to work with the idea well. Spend some time helping them see a strategy for which approach to take. ALEKS can again pick up some of the slack as needed. This is a good time

to introduce some problem-solving techniques. Two topics in this section to focus on: difference of squares and GCF

- One change here is that we do systems of non-linear equations. This allows time to review systems of linear equations while also introducing a new context. Keep the problems here simple with a quadratic and a linear in the same system and use the systems notation (the squiggly bracket).
- Rational Expressions and Equations: This area is mostly the same as it has been in the past.
- Functions: There is no emphasis on operations with functions. We also don't emphasize the students ability to graph functions (other than lines). We do, however, want them to be able to identify from the shape of the graph of what type of graph it is especially for linear, exponential, quadratic.
  - Notice that ALEKS doesn't do much with exponential functions. You should introduce exponentials anyway as they are key to modeling in 111. It will really help if the 111 student has some introduction to what they are ahead of time. Look at exponential vs. linear vs. quadratic on a table, a graph, and as an equation. At the point, identification is about as deep as we go.
  - Working with function notation is a big issue for most 111 students. Having time in 95 to practice the simpler examples will allow them more chances for success with 111's more difficult function notation problems.
  - Interpret points.
- Inequalities/Absolute Value: This chapter is mostly the same but quadratic inequalities/rational inequalities is not covered. Consider an absolute value inequality graphical approach for the foundation of this chapter.
- Radicals and Rational Exponents: Here we have made quite a few changes to lessen the load and make time for the lines we did at the beginning of the term. A good rule of thumb in this chapter: Keep is simple and useful. Be careful on ALEKS to assign problems that aren't outside of our focus.

It's difficult to explain what we mean by 'simple' and 'useful' so feel free to ask questions at any time. Here are some examples:

- Simplify  $\sqrt[3]{x^6}$  is a good problem to have students do as it simplifies nicely (defined here as not having variables outside and inside the radical in the simplified answer. Perhaps actually defined as: what looks nice by the instructors best guess)

- Simplify  $\sqrt[3]{x^7}$  is perhaps not a useful problem for us to cover. It's answer is arguably not much simpler than what we already have and doesn't provide much use in future classes. In essence, it seems to be a problem for the sake of simplifying that doesn't have much use beyond that. For our loosely defined word 'nice' this is not nice.
  - Simplify  $\sqrt{8x^4}$  is still a good problem because the variable part simplifies nicely. Knowing  $\sqrt{8} = 2\sqrt{2}$  does have use in future classes as well as when we get to the quadratic formula.
  - Simplify  $\sqrt[3]{81}$  also seems a decent problem for the same reasons as above.
  - There is no need to do operations on radicals with different indices. It takes time with little added benefit. We want to spend this time on lines instead. We do still deal with the rational exponent rules.
- More Quadratics: Here we have a few changes of focus as well.
    - We do not learn completing the square as a general rule. If you want to teach it and have time, you may, but it is not required.
    - Keep word problems on the simpler side. Focus on indentifying and interpreting vertex, points, and intercepts.
    - Allow more time for systems of non-linear equations if possible.

A few notes about our homework system:

We are using ALEKS. It includes the textbook. It is pseudo-adapts to the individual user by giving more practice on what the student needs vs. what the whole class needs. Daniel Ly (daniel.ly@mheducation.com) and he can help with any registration issues including coming the first day to get you set up. In general: students only need to buy the code not a separate textbook. The code does not come with used textbooks. A 365 code is good for the entire year. I have courses already created on ALEKS (or I will by 9/16!) and you can copy mine or do your own. I have decided not to work with due dates as I find giving my own due dates in class has been much more helpful. It allows me to work at the students' pace easier and allows the students to go back and work freely on previous material.

I hope you find this helpful. I am in Anstett 198C if you have questions or need more resources. Please consider sharing your own worksheets on the dropbox folder so we can all benefit. You are welcome to use anything from my syllabus or worksheets as you see fit.

Thank you,

Tammy