Math 70 Instructor Notes

Math 70 is roughly equivalent to Algebra 1. 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 most quizzes and exams in Math 70. 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. What's more, early 70 curriculum is focused on calculation questions that are easily done by the calculator. We focus on these so we can have a better understanding of how they work when we switch to algebra.

  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.

- 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 70 dropbox. If you are not yet on the dropbox, please email me at 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 70 is less than most math classes. Use this opportunity for plenty of review and opportunities to practice modeling.

- Typically Math 70 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 70 students often concentrate on their credit-bearing classes and stop coming unless they have motivation.

- Many of your Math 70 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 70 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 70 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 70 is on the syllabus along with the course goals. I have some extra notes here for you:

- The first section is the real numbers. Be sure to work without a calculator for this section! We teach decimals, fractions, integers, order of operations, absolute value and vocabulary around the real numbers. Be careful starting too easy here or you are likely to lose many of the students that need to be here! I like to let ALEKS cover a lot of the computation and focus instead on the understanding of why the rules work. Some topics/questions to consider:

  - Division by 0 or fractions with 0 denominators

  - Fractions operations with negative numbers. This is a good place to delve deeper into the rules. Consider asking questions such as: $\frac{3}{2} - \frac{1}{-5}$ or What is $-1\frac{2}{3}$ as an improper fraction?

  - Mixed numbers as fraction addition vs. fractions multipliation $2\frac{1}{3}$ vs. $2 \cdot \frac{1}{3}$

  - To make this section more useful, consider using the properties to help with arithmetic. Ex: $4 \cdot 17 = 4(10 + 7)$

  - Consider using the numberline to help with your examples.

- Algebraic expressions and properties is a great time to introduce the basics of solving word problems. ALEKS focuses on the typical ones we see in schools. I like to focus on ones that are all around us.

- ALEKS offers a lot of application problems in the linear equations section. You will need to pick and choose what to focus on. It's easy to accidentally assign too many problems in this section.

- Spend a lot of time having the students interpret points and (straight-forward) slopes

- The biggest focus of the class is with linear modeling. It is a great section to take your time on and develop the ideas. I would suggest avoiding the typical book approach of starting with the computations and working into the meaning. Instead, start with the meaning. What is slope? Where is slope around

us? I like to do lots of examples from the real world that focus on slope before I do anything else. Next, I introduce the idea of the y-intercept through context. I might do a problem like, I have 8 days saved of vacation and I earn 3 a month. Without asking any questions about it, I see if we can understand what it means. Where am I on day 0? What about day 1? etc. There are worksheets in the dropbox that take this approach and I am available for any questions.

- This will not be on ALEKS but you should introduce the idea of an exponential equation and what it's table looks like compared to that of a linear equation.