

Math 111: Mathematics for Elementary and Middle School Teachers I
Fall 2015 Section 501 CRN 34705
Syllabus

Instructor: Elaine Clark **Office:** Academic Bldg. Room 142A

Office Hours:

Face-to-Face at Valencia Campus: Tuesday 2:30 to 4:15 PM, Thursday 4:30 to 5:45 PM. **STEM Center:** Tuesday 1:30 to 2:30 PM

Online: Monday 10:30 AM to 1:00 PM and Thursday 4:30 to 5:30 PM and by appointment. They will occur at <https://meeting.unm.edu/ewclarkonline/>. I can be available on Fridays, in the evenings, and sometimes on Sundays for online office hours but you will need to schedule ahead for these.

UNM-West Campus: Monday and Wednesday 2:30 to 3:15 PM and after class.

Other hours by appointment

Phone: 925-8618 (my office), 925-8600 (Academic office)

email: ewclark@unm.edu or send a message in Blackboard Learn. I will check email Monday through Friday afternoon unless I am out of town. Expect a response within 24 hours to email messages sent Sunday afternoon through Thursday evening. If you send me a message on Friday afternoon through Sunday I will may not see it until Monday.

Course Prerequisites

In order for you to enroll in this course you will need to meet *one* of the following criteria:

- ACT greater or equal to 19
- SAT greater or equal to 450
- C or better in a previous UNM mathematics course numbered 100 or above.
- Compass Pre-Algebra score greater than 56
- Compass Algebra score greater than 33

Check with your advisor to determine if you meet one of these requirements.

Course Overview:

What is mathematics?

There are almost as many answers to this question as there are people who have thought to formulate an answer. Here are a few:

- Some would say it is "the science of quantity," by Charles Sanders Peirce in "The Essence of Mathematics." He goes on to say of this definition "...it seems to be a misunderstanding of a definition which may be very old, the original meaning being that mathematics is the science of quantities, that is, forms possessing quantity" (WOM, p. 1773).
- "Mathematics may be defined as the subject in which we never know what we are talking about, nor whether what we are saying is true." B. Russell (Bell p. 17; Eves After p. 176)

- "In the pure mathematics we contemplate absolute truths, which existed in the Divine Mind before the morning stars sang together, and which will continue to exist there, when the last of their radiant host shall have fallen from heaven." E. Everett (Bell p. 21)
- "So far as the external world is concerned, mathematics is as empty as a game imagined in a dream and forgotten on waking. Nothing whatever is in mathematics except the rules of the game, and these rules are prescribed at will by the player." (Bell, p. 260)

What is the purpose of this course?

The author of our primary text, Sybilla Beckmann, says in the foreword to our book, "It is easy to think that elementary school mathematics is simple and that it shouldn't require college-level study in order to teach it well. But to teach mathematics well, teachers must know more than just how to carry out basic mathematical procedures; *they must be able to explain why mathematics works the way it does.*" (emphasis mine)

So this course is all about what and why – the structure of mathematics. In particular we will **deconstruct** basic arithmetic, look below the surface of the familiar algorithms, and **reconstruct** this arithmetic, based on models and representations, and an understanding of the structure of mathematics. Thus this course is not about doing so much as about explaining. Learning how to effectively explain and use representations will be the main things you will do in this class.

Course Learning Objectives

This course offers an in-depth look at the representations of rational numbers and rational number arithmetic, including base-ten and decimal numbers, fractions, and arithmetic operations on these sets. Problem solving is emphasized throughout. **Chapters: 1, 2, 3, 4, and 5, and sections out of chapter 8 of our text by Sybilla Beckmann and Chapters 1 and 2 in the Pearson Custom booklet.**

A complete list of Student Learning Objectives for this course is at the end of the syllabus.

Text and Tools - Required

- The primary text for this course (and for Math 112 and Math 215) is "Mathematics for Elementary Teachers," 4th Edition, by Sybilla Beckmann.
- With this text you will have access to MyMathLab.
- As a second text you also need to purchase "Pearson Custom Education: Elementary and Middle School Mathematics" UNM-Valencia Custom Ed. This is a selection of four chapters from the book "Elementary and Middle School Mathematics: Teaching Developmentally" 7th Edition, by John a. Van de Walle and others. We will use chapters 1 and 2 for Math 111 and part of Chapter 2 and all of Chapters 3 and 4 in Math 112.
- For this semester I would also like you to enroll in the free online course through Stanford Online called "How to Learn Math." The link to the Stanford Online site is <https://class.stanford.edu/>. Scroll down on the home page until you see the icon for EDUC115-S: How to Learn Math: For Students. You will need to create a login profile as well. We will do this the first day of class.

Internet access is required. I will be posting all homework and discussion assignments, additional readings, messages, and other communications in Learn. Also, our book comes with a

MyMathLab component which we will be using. There are many resources available to you through the MML book. The access code should come shrink-wrapped with your book. And you will need Internet to access the Stanford Online course.

A four-function calculator will be useful from time to time. Some of you may be familiar with using the calculator provided on your cell phone, but simple four-function calculators are very inexpensive and a little easier to use than your cell phone in a group setting.

Paper, pencil, and eraser. Some people can do mathematical calculations in their heads but the purpose of this course is to show and explain all the steps of the calculations you are asked to complete. Also, though some people may be able to do things perfectly the first time, for mathematics it is best to use a pencil. I usually carry along an extra eraser.

Course Grade

Your Course Grade will come from:

- | | |
|--------------------------|-----|
| • Homework assignments | 15% |
| • Discussion postings | 15% |
| • In-class participation | 15% |
| • Unit tests | 30% |
| • Projects/papers | 10% |
| • Portfolio | 5% |
| • Final assessment | 10% |

You should log into Learn regularly for postings and weekly assignments.

Depending on the grading option you have chosen, your final course grade will be determined as follows:

- You will receive an A in the course if you have a weighted average of 90% or better.
- You will receive a B in the course if you have a weighted average of 80% to 89%.
- You will receive a C in the course if you have a weighted average of 70% to 79%.
- You will receive a D in the course if you have a weighted average of 50% to 69%.
- You will receive an F in the course if you have a weighted average less than 50%.
- You will receive a CR in the course if you have a weighted average of at least 70%.
- You will receive an NC in the course if you have a weighted average less than 70%.

I do not usually give a + grade unless you are on the borderline between two letters in which case I may give the C+ for example instead of the B-. I give the D+ instead of the C- because a C- is not a passing grade. **You must earn a C or better to pass this course.**

You can resubmit any graded assignment for a higher score if you would like, this includes unit tests but resubmissions are due within a week of when you received it back graded. Due dates for all assignments are on the preliminary schedule. Be sure to check in Learn in case there is a change in due date.

In-Class Activities and Attendance: 15% of your course grade

I will take roll each class day and your attendance will count in this portion of your grade. Also, we will spend many class sessions with some sort of problem solving exercise or activity that you will complete in groups. These activities are designed to build on what you have read and what we have discussed in class. If you do not do the assigned reading, discussion postings, and class activities assigned on our “off” days, you will not fully understand the purpose of the activities. If you miss class you can still do the activity for that day but it is up to you to ask what we did in class.

If you miss three (3) consecutive class periods, you may be dropped from the course. ***Do not assume I will drop you***, especially after the third week of class, but be aware it is an option I may exercise if warranted. If you miss any classes in the first week of a closed section, you *will* be dropped. If you show no or little progress, have not purchased your book, or have not made other arrangements for completing the homework by the end of the third week of class you *will* be dropped.

The last day to drop without being assigned a grade is Friday, September 4 by 5:00 pm.

Homework: 15% of your course grade

Because we focus on the underpinnings of mathematics, the why, rather than just computations, you will be asked to do more reading and writing than calculation.

Your homework will be two types:

- Questions and problem after sections of the reading, and,
- Class Activities that go with the reading (these are printed in the back portion of your book). Ideally you should do the class activities *while* you are reading the section.

I will give extensions for three assignments without need for documentation, meaning you can turn them in one class period late for full credit. I will not accept original assignments that are more than a week late. I have also posted videos in Learn for each section of our book to help you in making sense of the readings, so that you can do well on the homework. Feel free to email me at any time if you are having difficulty and want answers before our Tuesday class. Homework assigned during a week will be due the following Tuesday in class.

Discussion Postings: 15% of your course grade

Approximately each week you will be able to post to two types of discussion threads. One type will do with the content of the course from the textbook. Because this is a hybrid course, it is important for you to participate in these discussion postings. I have posted questions that can help you make sense of the concepts in that week’s assignments. If you share ideas, worries, misunderstandings, questions, and such about the mathematics with me and your classmates in the discussion forums, you will have a richer learning experience.

The other type of discussion threads will count in your project grade. See the description below. Look in Learn for the weekly discussion assignments.

Unit Tests: 30% of your course grade

There will be four unit tests which will collectively count for 30% of your course grade. These will be take-home rather than in-class tests so that you have time to think about your answers. I encourage you to work in study groups outside of class, but the final product you turn in for your tests must demonstrate your own, individual understanding of the material, not simply a parroting of the group consensus. If you do not show your own work and thought processes on the test, you may not receive credit. If you simply copy answers directly from the board when we review the test, you will receive at most half credit for the question. For the take-home tests you will receive no credit if you copy from a classmate, and the person you copy from also risks receiving no credit. Do not share your test papers! You **MUST** demonstrate that **you** have thought about the explanations given in class and have made them your own. Any papers for which I suspect cheating or copying, **both parties** will receive no credit.

Projects and Papers: 10% of your course grade

There are three projects/papers you will complete for this course:

- For your first term paper I will ask you to find out about the National Council of Teachers of Mathematics. See the posting in Learn in the appropriate folder.
- Your second project grade will come from discussion postings relating to the Stanford Class “How to Learn Mathematics,” and the videos from MyMathLab I will ask you to watch and discuss.

Each project/term paper is worth 100 points. ***Term papers must be completed individually.***

Portfolio: 5% of your course grade

Please collect all assignments, in-class and out-of-class, in a portfolio. You will be asked to organize these assignments in a way that is meaningful to you. At the end of the semester you will also be asked to complete a final self-assessment of your work based on these assignments.

Final Assessment: 10% of your course grade

During finals week you will be asked to present a lesson based on a mathematical concept pertinent to the course. Details for this will be given separately

Time to allot for out-of-class assignments: Plan right now to spend an average of 9 hours per week outside of class reading your texts, doing homework and discussion postings, and working on your unit tests. This time cannot all be lumped on the weekend; you will need to spend some time during the week as well. There is no guarantee you will pass if you dedicate this amount of time, you still need to demonstrate understanding of the material and use your time wisely, but you are not likely to pass if you don't.

Tools for Success

- We have a tutor assigned for this course and I will post more information about her in Learn.
- Study groups are a good option. But again, do not copy assignments from each other that are to be done individually.
- I have posted face-to-face office hours and am also available online. If the posted times are not convenient for you, let me know and we can schedule a mutually agreeable time.

Let me know if you plan to attend office hours so I don't run off to the copy room or something.

Plagiarism and Not Doing Your Own Work

It's a bad idea to plagiarize or to have other people do your work for you. Refer to the UNM-Valencia Catalog for the campus policy on "Dishonesty in Academic Matters." If I receive assignments from two or more people that are supposed to be done individually (for example, the homework assignments and unit tests) that are basically identical, you will *all* receive a zero for that assignment.

Classroom Behavior

Texting during class is not permitted. If you have a cell phone it must be silenced or set to vibrate. If you must take a call, please step out of the classroom even during group work. Some people like to have a laptop, netbook, or tablet in class to take notes and look up information on the Internet. As long as your use of a computer or mobile device does not disturb those around you and as long as what you are doing is pertinent to the class this is acceptable. If, however, you are doing something that does not have to do with what is happening in class I will ask you to put the device away.

No food is allowed in the classroom and only drinks that are in closed containers.

If you exhibit any behavior that is disruptive or I consider as endangering myself or other students, you will be asked to leave and I will report the incident to the Dean.

Netiquette Expectations

One of the overriding principles in online conversations is to "craft your responses effectively." It is sometimes difficult to remember that there are real people reading posted messages. This is especially true of online communication where others do not have the opportunity to see body language or hear tone of voice; therefore, they have a greater possibility of misunderstanding what is meant.

Please, follow these guidelines in all of your online responses and discussion postings.

- Honor everyone's right to an opinion.
- Do not belittle a person if you feel they are not fully understanding something.
- Respect the right of each person to disagree with others.
- Respond honestly but thoughtfully and respectfully; use language which others will not consider foul or abusive. You may also use emoticons to convey a lighter tone.
- Respect your own privacy and the privacy of others by not revealing information which you deem private and which you feel might embarrass you or others
- Be prepared to clarify statements which might be misunderstood or misinterpreted by others.

A Special Note about Anger

- Do not send messages that you have written when you are angry, even anonymous ones. In the online world, angry messages are known as "flaming" and are considered bad

behavior. Venting and flaming are two different things. It is possible to vent without sounding angry. Stick to the facts of what is causing you frustration.

- Do not send messages that are written all in upper case; this is the visual equivalent of SHOUTING. It is considered aggressive and is considered bad behavior. If you ever feel like shouting a message, take a deep breath and wait until you have calmed down before responding. Then, respond in a calm and factual manner.

In the discussion threads in Blackboard Learn I will provide a thread for venting. These postings will be anonymous and will allow you to vent any frustration you are feeling about the assignments, the course, and math in general. Sometimes I may answer these posts if there is an issue that needs addressing.

Equal Access

If you have a documented disability, please provide me with a copy of your letter from Equal Access Services as soon as possible to ensure that your accommodations are provided in a timely manner. It is up to you to obtain documentation of a disability by contacting Equal Access Services at Valencia Campus, Jeanne Lujan at (505)925-8910 and here is their web page: <http://www.unm.edu/~vcadvise/equalaccess.htm> . I will not guarantee accommodation without the appropriate documentation.

Student Learning Outcomes for Math 111

Course Goal # 1: Represent numbers and operations with models.

SLO 1: Use visual models, including physical objects, drawings of counts, lengths, and area, number lines, and symbols to represent numbers and operations, and flexibly move between representations.

SLO 2: Explain the relationship between contexts and the appropriate mathematical operations.

Course Goal # 2: Identify and use the deeper structures of arithmetic.

SLO 1: Analyze and perform multiple methods for doing addition, subtraction, multiplication and division.

SLO 2: Analyze student work, assess the validity of arguments, and identify mathematical misconceptions in mistakes.

SLO 3: Describe and use the relationships between operations to represent and solve problems.

SLO4: Describe and use strategies for mental computation and estimation using fact families, the structure of base-ten numbers, and the properties of arithmetic.

Course Goal # 3: Explain concepts in arithmetic.

SLO 1: Explain procedures for doing addition, subtraction, and multiplication with base-10 numbers using correct mathematical terminology and notation.

SLO 2: Explain procedures for doing addition, subtraction, and multiplication with fractions using correct mathematical terminology and notation.

SLO 3: Explain why the commutative and associative properties of addition and multiplication and the distributive property of multiplication over addition make sense.

SLO 4: Explain how estimation and rounding work using models and correct mathematical terminology and notation.

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Preliminary Schedule (subject to change as needed)

Week	Date	Day	Topic(s)	To Complete at Home	Will Do In Class
1	8/18	Tues.	Introduction, How to Learn Math, MyMathLab		Register for HTLM and MML; Number Sense Activity; Counting Stars;
	8/20	Thurs.	Counting	READ: Beckmann, Sect. 1.1; DO: Activity 1A, p. CA-1; Activity 1B #1-4, pp. CA-2&3; Exercise p. 12 #6; Discussion Postings (see full instructions in Learn)	Written activities you complete at home will be due the next Tuesday class meeting
8/23 Sun. Register in HTLM, and Discussion Postings and Responses due in Learn					
2	8/25	Tues.	Decimals; Rounding; Numbers Between; Place Value	TURN IN: Act. 1A, Act. 1B; Exercise from p. 12	Act. 1F #1,2 (what it means to "zoom in"); Act. 1I #1,2; Act. 1P
	8/27	Thurs.		READ: Beckmann, Sects. 1.2, 1.3, & 1.4; DO: Activity 1D p. CA-7; Activity 1N, p. CA-19; Exercises p. 25 #1; p. 33 #1,10	
<i>Last day to add a course or change sections: Friday, August 28 by 5:00 PM MT</i>					
<i>Last day to change grading option in LoboWeb: Friday, August 28 by 5:00 PM MT</i>					
8/30 Sun. HTLM Lesson 1, and Discussion Postings and Responses due in Learn					
3	9/1	Tues.	Problem Solving; Fractions as Numbers; Models for Fractions	TURN IN: Act. 1D, 1N, and exercises from p. 25 & 33	Selected Problems; Act. 2A #1,2; PC: Models and Sharing Tasks
	9/3	Thurs.		READ: Beckmann, Sects. 2.1, and 2.2; also read in Pearson Custom pp. 2 - 10 DO: Activity 2F, p. CA-30; Activity 2I, p. CA-33; Exercises p. 57 #1,4;	Be sure you have purchased the Pearson Custom book in addition to the Beckmann text
Last day to drop without a grade is Friday, September 4 by 5:00 PM					
9/6 Sun. Discussion Postings and Responses due in Learn					
Labor Day Holiday, Monday, September 7 (no class)					
4	9/8	Tues.	Fraction Language and Symbols; Equivalent Fractions	TURN IN: Act. 2F, 2I; Exercises from p. 57 of Beck. NCTM Paper due	Act. 2L Slicing Squares PC P&R p. 13

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Week	Date	Day	Topic(s)	To Complete at Home	Will Do In Class
4 cont.	9/10	Thurs.	Fraction Language and Symbols; Equivalent Fractions	READ: Pearson Cust. p. 10-22 and Beckmann, Sect. 2.3 DO: Pearson Cust. P&R p. 12; Activity 2K, p. CA-35; Activity 2P, p. CA-40; Ex. Beck. p. 58 #15, p. 67 #1	
	<i>Begin Unit 1 Take-Home Test</i>				
	Last day to change grading options with form is Friday, September 11 by 5:00 PM				
9/13 Sun. HTLM Lesson 2, and Discussion Postings and Responses due in Learn					
5	9/15	Tues.	Comparing Fractions	TURN IN: Act. 2k, 2P; Exercises from p. 58 & 67 in Beckmann and P&R p. 12 from PC	Questions on Unit 1 Test; Act. 2R
	9/17	Thurs.		READ: Beckmann Sect. 2.4 and Pearson Cust. pp. 15-22 DO: PC p. 17 P&R; Exercise from Beck p. 77 #1	
<i>END UNIT 1</i>					
9/20 Sun. Discussion Postings and Responses due in Learn					
6	9/22	Tues.	BEGIN UNIT 2	Unit 1 Test Due	Act. 3C, 3D, 3G
	9/24	Thurs.	Add/Subtract Problem Structures; Commutative & Associative Properties	READ: Beckman, Sect. 3.1 and 3.2 DO: Activity 3D, p. CA-51; Activity 3F, p. CA-53; Activity 3H, pp. CA-56-57 Exercises p. 99 #5, p. 109 #3	
9/27 Sun. HTLM Lesson 3, and Discussion Postings and Responses due in Learn					
7	9/29	Tues.	Addition and Subtraction Algorithms Add and Subtract Fractions; Writing Decimals as Fractions	TURN IN: Act. 3D, 3F, 3H; Exercises from p. 99 & 109	Alternative Algorithms for Addition and Subtraction; Add and Subtract with pizza
	10/1	Thurs.		READ: Beckmann Sect. 3.3 and Pearson Cust. pp. 25-29 DO: Activity 3J, p. CA-59; P&R p. 29 in PC Ex. Beck. p. 118 #6,7	
10/4 Sun. HTLM Lesson 4, and Discussion Postings and Responses due in Learn					
8	10/6	Tues.	Addition and Subtraction of Integers	TURN IN: Act. 3J, P&R problems from PC, Ex. p. 118	Model for Adding and Subtracting Integers
	Unit 1 Test Corrected				

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Week	Date	Day	Topic(s)	To Complete at Home	Will Do In Class
Fall Break Thursday - Sunday, October 8 through 11					
9	10/13	Tues.	Algorithms for Adding and Subtracting Fractions	TURN IN: Midterm Portfolio	Act. 3O, 3P; Questions from Unit 2 Test
	Begin Unit 2 Take-Home Test				
	10/15	Thurs.	END UNIT 2	READ: Beckman, Sect. 3.4 and Pearson Cust. p. 31-33; DO: Exercises p. 129 #10,12	
10/18 Sun. Discussion Postings and Responses due in Learn					
10	10/20	Tues.	BEGIN UNIT 3 Multiplication Problem Structures; Comm. and Associative Props.	TURN IN: Ex. from p. 129 Unit 2 Test Due	Act. 4A, Act. 4B #1-4, Circles and Stars
	10/22	Thurs.		READ: Beckman, Sects. 4.1, 4.2, and 4.3 DO: Activity 4D, p. CA-74; Exercises p. 145 #1,8; p. 148 #2; p. 159 #5,9	
10/25 Sun. HTLM Lesson 5, and Discussion Postings and Responses due in Learn					
11	10/27	Tues.	Distributive Property, Order of Operations, and Multiplication Algorithms	TURN IN: Act. 4D, Exercises from p. 145, 148,159	Act. 4K; Alternative Multiplication Algorithms
	10/29	Thurs.		READ: Beck, Sects. 4.4 & 4.6 DO: Activity 4L, p. CA-83; Activity 4R, p. CA-90; Exercises p. 171 #1,2; p. 189-190 #8,12	
11/1 Sun. HTLM Lesson 6, and Discussion Postings and Responses due in Learn					
12	11/3	Tues.	Multiplying Fractions	TURN IN: Act. 4L, Act. 4R, Exercises from p. 171, 189-190	Act. 2C, Act. 5C, Act. 5E, Activities from Pearson Custom
	11/5	Thurs.		READ: Beck, Sect. 5.1 and Pearson Custom pp. 33 -37 DO: Activity 5A, p. CA-95-96 Exercises p. 201 #5,7 Watch Set 1 of IMAP videos in MyMathLab and discuss	
Last day to withdraw without Deans approval is Friday, November 6 by 5:00 PM					
11/8 Sun. Discussion Postings and Responses due in Learn					
13	11/10	Tues.	Multiply Decimals and Integers	TURN IN: Act. 5A Exercises from p. 201	Act. 5F and Model for Multiplying Integers

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Week	Date	Day	Topic(s)	To Complete at Home	Will Do In Class
13 cont.	11/12	Thurs	Multiply Decimals and Integers	READ: Beck, Sect. 5.2 DO: Activity 5G, p. CA-102 Exercises p. 207 # 3 Watch Set 2 of IMAP videos in MyMathLab and discuss	
11/15 Sun. Discussion Postings and Responses due in Learn					
14	11/17	Tues.	Factors & Multiples, Even & Odd, Divisibility Tests	TURN IN: Act. 5G Exercises from p. 207	Act. 8C, Act. 8D
	11/19	Thurs.		READ: Beck, Sects. 8.1, 8.2, and 8.3 DO: Activity 8A, p. CA-149; Activity 8E, p. CA-152; Exercises p. 320 #1; p. 324 #1; p. 328 #1 Watch Set 3 of IMAP videos in MyMathLab and discuss	
Begin Unit 3 Take-Home Test					
11/22 Sun. Discussion Postings and Responses due in Learn					
15	11/24	Tues.	Prime Numbers	TURN IN: Act. 8A, Act. 8E, Exs. from p. 320, 324, 328	Act. 8H; Questions from Unit 3 test
				Final Project Topics due	
Thanksgiving Break Thursday - Sunday, November 26 through 29					
16	11/30	Mon.	GCF & LCM	READ: Beck, Sects. 8.4 & 8.5 DO: Handout posted in Learn on GCF & LCM	
	12/1	Tues.		TURN IN: GCF & LCM Handout posted in Learn	Work on Test 3 and any other questions
				Portfolios due	
				Unit 3 Test Due	
Last day to withdraw with Deans approval is Friday, December 4 by 5:00 PM					
12/10 Thurs Final Project Presentations - 4:00 to 6:00 PM					