

Math 103 - WvEB College Algebra

FALL 2007

3 credit hours

INSTRUCTOR: Cecilia Fizer	OFFICE: Concord University Science Bldg.; Room 108
PHONE: 384-6029 EMAIL: cecilia@concord.edu	PREREQUISITES: Math ACT \geq 19 Numerical SAT \geq 460
TEXT: Sullivan : Algebra and Trigonometry, 4th edition. Upper Saddle River, NJ, Prentice -Hall.	CD: WvEB Algebra, Pyzdrowski

- **You must work with a laboratory partner in your school to receive full participation points on the lab.**
- **Late labs will have a 10% deduction for each week that it is late after the test on which the lab appears.**

Objectives: The general goals of this course are common to all the courses in the Institute for Math Learning at WVU:

- CONCEPTUAL UNDERSTANDING: rather than just rote memorization of algorithms
- MULTIPLE APPROACHES: to examine problems from analytical, geometric and numeric perspectives, to make judgements about the appropriateness of the choice of formal or approximate methods of solution
- TECHNOLOGY AS A TOOL: use technology as an integral part of the process of formulation, solution, and communication, to gain experience in selecting the proper tool for a given problem
- ACTIVE STUDENT LEARNING: to engage in the exploration and discovery of concepts and to learn to work cooperatively to solve problems
- COMMUNICATION OF IDEAS: to demonstrate understanding by explaining in written or oral form the meanings and applications of concepts
- PROBLEM SOLVING: gain experience as a problem solver, to analyze problems in an organized manner
- APPLICATIONS: use mathematics to model and solve problems
- HISTORY OF MATHEMATICS: to learn about mathematics as a human endeavor.

The specific goals of this course will be to stress an algebraic, graphical, and numerical approach to the study of:

- understanding and using the concept of function
- mathematical application problems
- solving equations and inequalities in one variable using multiple representations
- graphing equations and functions
- lines, parabolas, and circles
- higher order polynomial, rational, radical, absolute value, exponential and logarithmic functions
- systems of equations and matrices

To accomplish course goals, the class incorporates interactive laboratories which use technology and student activities that emphasize writing and student collaboration. Students will work in pairs or triads on the laboratories in order to develop mathematical communication skills. The development of your communication skills is an integral part of the course.

Evaluation: Multiple forms of assessment will be used to measure your understanding of algebraic concepts and problem solving. The point distribution of these assessments is:

Assessment	Number	Maximum Points Awarded
Exams : There will be four tests given throughout the semester, each is worth 100 points	4	400
Comprehensive Final: There will be a comprehensive final worth 200 points	1	200
Laboratory Assignments: There will be 8 computer laboratory assignments. The laboratory scores will be averaged. You will be awarded laboratory points that are 2 times your laboratory average. Laboratory assignments should be done with a partner. Some points are awarded for the ability to communicate about mathematics. Any laboratories not submitted as a team effort, will not be awarded communication points.	8	200
Quizzes: There will be 6 online homework quizzes and two ACT quizzes. The online homework quizzes are immediately graded and will be averaged for a possible 100 points. Homework Quizzes are open book and open notes, but must be done without help of your high school teacher-facilitator. You may attempt each HQ up to three times. You must complete at least one of each HQ before the test which includes the HQ sections. The HQ portion of the course will be “turned off” by 5:00 pm server time, December 10, 2006.	6	100
Each ACT Quiz can allow you to earn bonus course points: $1 \leq \text{number correct} \leq 21$, earn 1 bonus point $40 \leq \text{number correct} \leq 41$, earn 6 bonus point $22 \leq \text{number correct} \leq 28$, earn 2 bonus point $42 \leq \text{number correct} \leq 44$, earn 7 bonus point $29 \leq \text{number correct} \leq 31$, earn 3 bonus point $45 \leq \text{number correct} \leq 47$, earn 8 bonus point $32 \leq \text{number correct} \leq 34$, earn 4 bonus point $48 \leq \text{number correct} \leq 49$, earn 9 bonus point $35 \leq \text{number correct} \leq 39$, earn 5 bonus point $50 \leq \text{number correct} \leq 60$, earn 10 bonus point	2	20

Your Concord grade will be determined as follows:

810 - 900 points	A
720 - 809.9 points	B
630 - 719.9 points	C
540 - 629.9 points	D
0 - 539.9 points	F

On average, you should expect to study two hours outside of class for each one hour spent in class. If you are spending more time, then you may need to seek help. There are several excellent sources for such help. First, seek help from your classmates; use the WebCT discussion group to get help; or set up your own study group. Often, classmates can explain the problem satisfactorily since they have also been working on it. You may also seek assistance from your facilitator.

UNIT 1 (Weeks 1 - 4)
Pre-ACT, Review and Solving Equations

Pre-ACT Test

U1.1	<i>Section</i>	R.1 - R.3
	<i>Lecture</i>	Review 1
U1.2	<i>Section</i>	R.4 - R.5
	<i>Lecture</i>	Review 2
U1.3	<i>Section</i>	R.7 - R.8
	<i>Lecture</i>	Review 3
	<i>Quiz 1</i>	R.1 - R..5, R.7 - R.8
U1.4	<i>Section</i>	1.1
	<i>Lecture</i>	Distance, Midpoints, and Graphs of Equations
U1.5	<i>Section</i>	1.2
	<i>Lecture</i>	Equations and Applications
U1.6	<i>Section</i>	1.3, 1.5
	<i>Lecture</i>	Quadratic and Other Types of Equations
	<i>Lab</i>	Introduction and Basic Graphs
	<i>Quiz 2</i>	1.1-1.3, 1.5
	Test 1	R.1 - R..5, R.7 - R.8 , 1.1-1.3, 1.5 (Week 4)

UNIT 2 (Weeks 4 - 7)
Inequalities, Lines and Circles, and Introduction to Functions

U2.1	<i>Section</i>	1.7
	<i>Lectures</i>	Inequality Review 1 & Inequality Review 2
U2.2	<i>Section</i>	1.8 - 1.9
	<i>Lecture</i>	Lines
U2.3	<i>Section</i>	2.1
	<i>Lecture</i>	Review: Distance, Midpoints, and Graphs of Equations
	<i>Lab</i>	Graphing Techniques
U2.4	<i>Section</i>	2.2 - 2.4, 2.6
	<i>Lecture</i>	Functions
	<i>Lab</i>	The Box Problem
	<i>Quiz 3</i>	1.7 - 1.9, 2.1 - 2.4, 2.6
	Test 2	1.7 - 1.9, 2.1 - 2.4, 2.6 (Week 7)

UNIT 3 (Weeks 7 - 10)
Operations on Functions, Quadratic Functions
and Polynomial Functions

U3.1	<i>Section</i>	2.7 - 2.8, 4.1
	<i>Lecture</i>	Graphing Techniques and Operations on Functions
U3.2	<i>Section</i>	3.1, 1.4
	<i>Lecture</i>	Quadratic Functions and Negative Discriminants
	<i>Lab</i>	Quadratic Functions
U3.3	<i>Section</i>	3.2, R.6
	<i>Lecture</i>	Polynomial Functions and Synthetic Division
	<i>Lab</i>	Polynomial Functions
	<i>Quiz 4</i>	2.7 - 2.8, 4.1, 3.1 - 3.2, 1.4, R.6
	Test 3	2.7 - 2.8, 4.1, 3.1 - 3.2, 1.4, R.6 (Week 10)

UNIT 4 (Weeks 10 - 13)
Rational Functions and Exponential Functions

U4.1	<i>Section</i>	3.3 - 3.4
	<i>Lecture</i>	Rational Functions
	<i>Lab</i>	Rational Functions
U4.2	<i>Section</i>	3.6 - 3.7
	<i>Lecture</i>	Real Zeros and the Fundamental Theorem of Algebra
U4.3	<i>Section</i>	4.2 - 4.3
	<i>Lecture</i>	One to One, Inverse, and Exponential Functions
	<i>Lab</i>	Exponential Functions
	<i>Quiz 5</i>	3.3 - 3.4, 3.6 - 3.7, 4.2 - 4.3
	<i>Test 4</i>	3.3 - 3.4, 3.6 - 3.7, 4.2 - 4.3 (Week 13)

UNIT 5 (Weeks 13 - 15)
Logarithmic Functions and Systems of Equations

U5.1	<i>Section</i>	4.4 - 4.6
	<i>Lecture</i>	Logarithms
	<i>Lab</i>	Logarithmic Functions
U5.2	<i>Section</i>	4.7 - 4.8
	<i>Lecture</i>	Compound Interest Growth and Decay
U5.3	<i>Section</i>	5.1 - 5.2
	<i>Lecture</i>	Systems of Equations
	<i>Quiz 6</i>	4.4 - 4.8, 5.1 - 5.2

FINAL

Comprehensive Final: Wednesday, December 12

Section	Name	Problem Numbers
R.1	Real Numbers	1, 9, 11, 13, 15, 27, 29, 33, 35, 39, 45, 47, 53, 63, 69, 71, 75
R.2	Algebra Review	4, 11, 15, 23, 24, 31, 37, 41, 45, 47, 49, 57, 59, 61, 65, 73, 74, 75, 76, 77, 87, 89, 93, 95, 141
R.3	Geometry Review	7, 17, 21, 23, 25, 27, 33, 35
R.4	Polynomials	7, 9, 17, 21, 29, 31, 34, 39, 47, 55, 69, 93, 97
R.5	Factoring Polynomials	5, 13, 17, 25, 33, 39, 45, 51, 57, 61, 65, 85, 91, 95, 105, 107, 121
R.6	Synthetic Division	5, 9, 17
R.7	Rational Expressions	5, 13, 19, 25, 31, 47, 53, 63, 73
R.8	n th Roots; Rational Exponents	1, 2, 7, 15, 17, 21, 23, 31, 43, 47, 55, 63, 71, 75
1.1	Rectangular Coordinates;	5, 7, 9, 13, 33, 39, 49, 57, 64, 75, 77, 79, 83, 95, 105
1.2	Solving Equations Using a	77, 41, 43, 45, 51, 53, 55, 61, 71, 89, 95, 99, 101, 105, 107, 109
1.3	Quadratic Equations	5, 6, 13, 15, 17, 25, 35, 37, 39, 43, 47, 49, 61, 69, 73, 75, 85, 87, 93
1.4	Complex Numbers; Quadratic	9, 13, 19, 26, 27, 31, 33, 35, 49, 51, 53, 59, 73, 79
1.5	Radical Equations; Equations in	13, 17, 25, 29, 35, 39, 59, 65, 71, 81, 83, 100, 103, 107
1.7	Solving Inequalities	11, 13, 14, 25, 29, 33, 37, 51, 53, 65, 73, 77, 83, 89, 91, 95, 97, 107, 109
1.8	Lines	9, 13, 23, 25, 27, 37, 39, 41, 53, 59, 71, 77, 79, 91, 111, 115
1.9	Circles	4, 7, 9, 15, 21, 25, 29, 33, 35, 37
2.1	Symmetry; Graphing Key	7, 13, 17, 25, 27, 31, 37, 39, 43, 49
2.2	Functions	15, 19, 27, 33, 39, 41, 53, 57, 55, 61, 65, 73, 75, 89, 98
2.3	The Graph of a Function	9, 13, 15, 23, 25, 37
2.4	Properties of Functions	11, 13, 15, 17, 19, 21, 29, 33, 53, 63, 64
2.6	Library of Functions; Piece-wise	9, 10, 11, 12, 13, 14, 15, 16, 25, 29, 35, 41, 43
2.7	Graphing Techniques:	7, 9, 11, 13, 15, 17, 19, 27, 31, 41, 59, 65
2.8	Math Models: Construction	3, 7, 8, 9, 11, 13, 14, 15, 29, 31
3.1	Quadratic Functions and Models	11, 13, 15, 17, 27, 45, 51, 53, 59, 71, 79, 81, 85
3.2	Polynomial Functions and Models	11, 15, 23, 25, 32, 37, 43, 55, 65, 75, 79, 91
3.3	Properties of Rational Functions	13, 23, 25, 31, 41, 45, 49
3.4	Graphs of Rational Functions	7, 15, 27, 33, 35, 51, 61
3.6	The Real Zeros of a Polynomial	11, 13, 21, 27, 39, 43, 63, 73
3.7	Complex Zeros	7, 9, 17, 23, 33
4.1	Composite Functions	7, 9, 11, 19, 47, 53, 69, 63
4.2	One-to-one functions; Inverse	11, 15, 19, 21, 33, 41, 50, 63, 65, 80
4.3	Exponential Functions	15, 21, 23, 25, 27, 29, 31, 33, 35, 39, 45, 53, 63, 67, 71, 77, 101
4.4	Logarithmic Functions	15, 19, 23, 31, 39, 45, 61, 67-74, 77, 85, 89, 91, 101, 111
4.5	Properties of Logarithmic	2, 13, 15, 23, 27, 41, 49, 51, 53, 61, 63, 65, 69, 75, 76, 83
4.6	Logarithmic and Exponential	7, 11, 15, 19, 23, 27, 31, 45
4.7	Compound Interest	7, 15, 29, 31, 35, 39, 49
4.8	Exponential Growth and Decay	1, 3, 7, 9, 11
5.1	Systems of Linear Equations:	7, 11, 19, 23, 25, 29, 41, 55
5.2	Systems of Linear Equations: Matrices	5, 11, 17, 39, 41, 51