

WvEB College Algebra: Fall 2009 and Spring 2010  
3 credits

**FINAL: No later than December 14 for Fall 2009**  
**No later than May 3 for Spring 2010**

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TEXT: Sullivan : Algebra and Trigonometry, 5th edition. Upper Saddle River, NJ, Prentice -Hall. Special WVU Edition	Lab Manual: Pyzdrowski CD: WvEB Algebra, Pyzdrowski available through your school

- **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

The specific goals of this course will be to stress an algebraic, graphic, and numeric 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:



**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>	2.1
	<i>Lecture</i>	Review: Distance, Midpoints, and Graphs of Equations
	<i>Lab</i>	Graphing Techniques
U2.3	<i>Section</i>	2.2 - 2.3
	<i>Lecture</i>	Lines
U2.4	<i>Section</i>	3.1 - 3.4
	<i>Lecture</i>	Functions
	<i>Lab</i>	The Box Problem
	<i>Quiz 3</i>	1.7, 2.1 - 2.3, 3.1 - 3.4
	Test 2	1.7, 2.1 - 2.3, 3.1 - 3.4 (Week 7)

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

U3.1	<i>Section</i>	3.5 - 3.6, 6.1
	<i>Lecture</i>	Graphing Techniques and Operations on Functions
U3.2	<i>Section</i>	4.3, 4.4, 1.4
	<i>Lecture</i>	Quadratic Functions and Negative Discriminants
	<i>Lab</i>	Quadratic Functions

U3.3	<i>Section</i>	5.1, R.6
	<i>Lecture</i>	Polynomial Functions and Synthetic Division
	<i>Lab</i>	Polynomial Functions
	<i>Quiz 4</i>	3.5 - 3.6, 6.1, 4.3 - 4.4, 5.1, 1.4, R.6
	Test 3	3.5 - 3.6, 6.1, 4.3 - 4.4, 5.1, 1.4, R.6 (Week 10)

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

U4.1	<i>Section</i>	5.2 - 5.3
	<i>Lecture</i>	Rational Functions
	<i>Lab</i>	Rational Functions
U4.2	<i>Section</i>	5.5 - 5.6
	<i>Lecture</i>	Real Zeros and the Fundamental Theorem of Algebra
U4.3	<i>Section</i>	6.2 - 6.3
	<i>Lecture</i>	One to One, Inverse, and Exponential Functions
	<i>Lab</i>	Exponential Functions
	<i>Quiz 5</i>	5.2 - 5.3, 5.5 - 5.6, 6.2 - 6.3
	Test 4	5.2 - 5.3, 5.5 - 5.6, 6.2 - 6.3 (Week 13)

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

U5.1	<i>Section</i>	6.4 - 6.6
	<i>Lecture</i>	Logarithms
	<i>Lab</i>	Logarithmic Functions
U5.2	<i>Section</i>	6.7 - 6.8
	<i>Lecture</i>	Compound Interest Growth and Decay
U5.3	<i>Section</i>	12.1 - 12.2
	<i>Lecture</i>	Systems of Equations
	<i>Quiz 6</i>	6.4 - 6.8, 12.1 - 12.2

**FINAL**

Comprehensive Final ( Week 15 or 16 )  
Post-ACT Test

## Homework Assignments for College Algebra 2009-20010

Section	Name	Problem Numbers
R.1	Real Numbers	1, 21, 23, 25, 27, 33, 35, 39, 41, 45, 51, 57, 59, 65, 69, 75, 81, 87, 91, 93
R.2	Algebra Essentials	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 Essentials	11, 21, 25, 27, 29, 31, 37, 39
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; Graphing Utilities; Introduction to Graphing Equations	5, 7, 9, 13, 33, 39, 49, 57, 64, 75, 77, 79, 83, 95, 105
1.2	Solving Equations Using a Graphing Utility; Linear and Rational Equations	41, 43, 45, 51, 53, 55, 61, 71, 77, 89, 95, 99, 101, 105, 107, 109
1.3	Quadratic Equations	5, 6, 13, 15, 17, 23, 25, 37, 39, 41, 45, 49, 51, 63, 67, 79, 83, 97, 99, 105
1.4	Complex Numbers; Quadratic Equations in Complex Number System	9, 13, 19, 26, 27, 31, 33, 35, 49, 51, 53, 59, 73, 79
1.5	Radical Equations; Equations in Quadratic Form, Absolute Value Equations; Factorable Equations	11, 15, 23, 25, 31, 35, 51, 57, 61, 67, 69, 86, 89, 116
1.7	Solving Inequalities	11, 12, 14, 23, 27, 31, 35, 47, 49, 59, 65, 69, 71, 73, 77, 79, 83, 107, 109
2.1	Intercepts, Symmetry; Graphing Key Equations	13, 21, 27, 31, 39, 41, 45, 51, 69, 71
2.2	Lines	13, 17, 27, 29, 31, 41, 43, 45, 59, 65, 77, 83, 85, 97, 121, 127, 128
2.3	Circles	6, 9, 11, 17, 23, 27, 31, 32, 37, 39, 43
3.1	Functions	15, 19, 27, 33, 39, 41, 53, 55, 57, 61, 65, 73, 75, 93, 104
3.2	The Graph of a Function	9, 13, 15, 23, 25, 39
3.3	Properties of Functions	11, 13, 15, 17, 19, 21, 29, 33, 53, 59, 69, 73, 75
3.4	Library of Functions: Piecewise-defined Functions	9, 10, 11, 12, 13, 14, 15, 16, 25, 29, 35, 41, 43, 47
3.5	Graphing Techniques: Transformations	7, 9, 11, 13, 15, 17, 19, 27, 31, 41, 45, 63, 69
3.6	Math Models: Building Functions	2, 3, 5, 6, 7, 21, 23, 25, 26
4.3	Quadratic Functions and Their Properties	11, 13, 15, 17, 27, 37, 41, 43, 49, 83
4.4	Building Quadratic Models from Verbal Descriptions and from Data	3, 7, 8, 9, 11, 15
5.1	Polynomial Functions and Models	11, 15, 23, 25, 32, 37, 43, 55, 61, 69, 71, 79, 91
5.2	Properties of Rational Functions	13, 23, 25, 31, 41, 45, 51
5.3	The Graph of a Rational Function	7, 15, 27, 33, 35, 51, 61
5.5	The Real Zeros of a Polynomial Function	11, 13, 21, 27, 39, 43, 63, 73
5.6	Complex Zeros, Fundamental Theorem of Algebra	7, 9, 17, 23, 33
6.1	Composite Functions	7, 9, 11, 19, 47, 53, 65, 71
6.2	One-to-one functions; Inverse functions	11, 15, 19, 21, 35, 43, 50, 63, 65, 90
6.3	Exponential Functions	15, 21, 22, 23, 25, 27, 29, 31, 33, 35, 38, 49, 59, 63, 77, 81, 97, 121
6.4	Logarithmic Functions	13, 15, 19, 23, 31, 37, 57, 63, 70, 73, 79, 81, 87, 97
6.5	Properties of Logarithmic Functions	2, 13, 15, 23, 27, 41, 49, 51, 53, 61, 63, 65, 69, 75, 76, 85
6.6	Logarithmic and Exponential Equations	11, 15, 25, 37, 43, 47, 51, 81
6.7	Financial Models	7, 15, 29, 35, 41, 45, 54
6.8	Exponential Growth and Decay	1, 3, 7, 9, 11
12.1	Systems of Linear Equations: Substitution and Elimination	7, 11, 19, 23, 25, 29, 41, 55
12.2	Systems of Linear Equations: Matrices	5, 11, 17, 39, 41, 51