
Medgar Evers College – Department of Mathematics
Algebra and Coordinate Geometry
MTH 120, Section 005, Spring 2012
1 credit, 3 hours



Mondays and Wednesdays, 2:30 – 3:45 pm in Room S-105

Instructor. Bart Van Steirteghem

office: AB1-L05V

office hours: Monday 10:40 – 11:30 am, Wednesday 1:00 – 2:15 pm
or by appointment

email: bartvs@mec.cuny.edu

course website: <http://bvans.net/mth120> — Check it often!

Text. *Elementary Algebra (version 1.0)*, by John Redden (Flat World Knowledge, February 2011)
The textbook is available at the Medgar Evers College Bookstore. It can be read online at no cost
at <http://catalog.flatworldknowledge.com/catalog/editions/68>
A print-it-yourself pdf version is available for \$24.95 at the same website.

Additional recommended texts.

- *Schaum's Outline of Intermediate Algebra*, 2nd Edition, by Ray Steege and Kerry Bailey, McGraw-Hill (2010)
- *Algebra* by I.M. Gelfand and A. Shen, Birkhäuser (1993)

Prerequisites. MTHP 010 or exemption by CUNY Assessment Tests

Introduction. Welcome to Algebra and Coordinate Geometry! What is Algebra about? Here is an answer that Steven Strogatz wrote in *The Joy of X*¹ on his *New York Times* blog:

Algebra, for example, may [strike] you as a dizzying mix of symbols, definitions and procedures, but in the end they all boil down to just two activities – solving for x and working with formulas.

Solving for x is detective work. You're searching for an unknown number, x . You've been handed a few clues about it, either in the form of an equation like $2x + 3 = 7$, or, less conveniently, in a convoluted verbal description of it (as in those scary word problems). In either case, the goal is to identify x from the information given.

Working with formulas, on the other hand, is a bit like art and science. Instead of dwelling on a particular x , you're manipulating and massaging relationships that continue to hold, even as the numbers in them change. These changing numbers are called variables, and they are what truly distinguishes algebra from arithmetic.

The formulas in question might express elegant patterns about numbers for their own sake. This is where algebra meets art. Or they might express relationships between numbers in the real world, as they do in the laws of nature for falling objects or planetary orbits or genetic frequencies in a population. This is where algebra meets science.

In this course, we will **solve for x** , **work with formulas** and graphically represent and study equations, which is where algebra meets **geometry**.

¹<http://opinionator.blogs.nytimes.com/2010/02/28/the-joy-of-x/>

Course description. This course is intended to provide the mathematical knowledge and understanding necessary for students to continue their study of mathematics and be able to take the courses for which mathematical knowledge is a prerequisite or co-requisite. The course emphasizes the basics of algebraic methods, including work with exponents, polynomials, and rational expressions, the solution of linear and quadratic equations, coordinate geometry, systems of linear equations, and applications of algebra to practical problems.

Course objectives. After completing this course, you will

- understand coordinates and how to use them;
- be able to solve linear, quadratic, simple higher order equations in one unknown, and systems of two linear equations in two unknowns;
- understand basic geometrical concepts (points, lines, conics) and their algebraic representation;
- be able to translate geometric problems into algebraic ones, and vice versa;
- be fluent in fundamental algebraic techniques, including the ability to perform algebraic manipulations that involve powers, radicals, polynomials and rational expressions;
- be able to apply techniques from algebra to solve practical problems;
- be aware of the role algebra plays in geometry, and in mathematics in general.

Course Expectations.

Attendance: Regular attendance is expected. Cooperative classwork assignments and collaborative learning are essential activities in this course. The lectures are intended to benefit you and you will generally profit by maintaining a perfect attendance record.

Preparation: You should prepare for each lecture by reading in advance the material to be covered. As a general rule, allow one hour of preparation for each hour of classwork. It is best to ask questions pertinent to the lecture as soon as they come to mind. Preoccupation with unanswered questions will keep you from following the lecture.

Assignments. Homework is assigned to assist you in gaining a firm grasp of the material and to give you feedback on how well you've mastered it. Learning mathematics requires a lot of practice. Assignments will be discussed in class immediately after they are due. You will have three types of assignments.

1. **WeBWorK:** You will complete the majority of your assignments online via the web-based interactive computer system called WeBWorK. Unless instructed otherwise, WeBWorK is due *every Monday at 2:15pm*.
WeBWorK URL <https://courses.webwork.maa.org/webwork2/meccuny-mth120/>
2. **Written assignments:** I will assign, collect, and grade a few written assignments during the semester. Use pen or pencil on lined paper and be sure to write clearly.
3. **Class assignments:** In class assignments will give you a chance to practice working on more in-depth and challenging problems in collaboration with the class, as a whole or in small groups.

Exams. There will be two class exams, one departmental midterm and a comprehensive departmental final. The exact dates will be announced well in advance. There will be no make-up exams. (Final will take place during the week May 17-24, 2012, exact date to be announced)

Assistance.

1. Office hours: Mon 10:40 – 11:30 am, Wed 1:00 – 2:15 pm, or by appointment.
2. Tutoring: freely available in the Department of Mathematics, AB1-L05.
3. The College provides free tutoring at the Learning Center - Room B-2034, Bedford Building.

Advice.

1. Anything of worth requires work.
2. Take advantage of your time in class: be attentive, take clear notes, ask questions, participate.
3. Prepare for each class by reading the sections we will cover (see the course outline below or the course website).
4. Schedule at least *two* hours of study and homework time for each hour of class time.
5. Taking the time to do your homework will pay off.
6. Do not fall behind. Take advantage of the resources listed above as soon as necessary.

Grade.

- 20% Assignments
- 20% Class Exam 1
- 20% Class Exam 2
- 15% Departmental Midterm
- 25% Final exam

STUDENTS MUST PASS THE DEPARTMENTAL FINAL EXAM TO RECEIVE A PASSING GRADE. There will be no makeup for the departmental exams. In general, student who miss the departmental final exam, will receive a failing grade for the course.

College's accommodation policy for students with disabilities. Federal law prohibits discrimination on the basis of a disability. Under the guidelines of the Americans with Disabilities Act, the College will provide reasonable accommodations to persons with documented disabilities. Therefore, if you are in need of or have any questions regarding accommodations or services, please contact Mr. Anthony Phifer, Director, Office of Services for the Differently-Abled (Bedford Building Room 1011) at 718-270-5027 or aphifer@mec.cuny.edu. Any information provided to the office will be confidential and will not be released without your permission.

Course Outline

Class #	Topic	Section
1	Introduction to Algebra Review: Simplifying Algebraic Expressions Review: Solving Linear Equations	2.1 2.2 2.3, 2.4
2	Introduction to Inequalities and Interval Notation Linear Inequalities (One Variable)	2.7 2.8
3	Rectangular Coordinate System	3.1
4	Graphing Lines: Graph by Plotting Points Graphing Lines: Graph Using Intercepts	3.2 3.3
5	Graphing Lines: Graph Using the y-intercept and Slope	3.4
6	Finding Linear Equations Parallel and Perpendicular Lines	3.5 3.6
7	Solving Linear Systems	4.1 – 4.3
8	Applications of Linear Systems	4.4
9	Class Exam	
10	Rules of Exponents and Introduction to Polynomials Adding, Subtracting and Multiplying Polynomials	5.1, 5.2 5.3, 5.4
11	Dividing Polynomials	5.5
12	Introduction to Factoring	6.1
13	Factoring Trinomials Factoring Special Binomials	6.2, 6.3 6.4
14	General Guidelines for Factoring Polynomials Solving Equations by Factoring	6.5 6.6
15	Departmental Midterm	
16	Simplifying Rational Expressions Multiplying and Dividing Rational Expressions	7.1 7.2
17	Adding and Subtracting Rational Expressions Complex Rational Expressions	7.3 7.4
18	Solving Rational Equations Applications of Rational Equations	7.5 7.6
19	Radicals Simplifying Radical Expression	8.1 8.2
20	Adding and Subtracting Radical Expressions Multiplying and Dividing Radical Expressions	8.3 8.4
21	Rational Exponents Solving Radical Equations	8.5 8.6
22	Class Exam	
23	Solving Quadratic Equations by Extracting Square Roots Completing the Square	9.1 9.2
24	Quadratic Formula	9.3
25	Guidelines for Solving Quadratic Equations and Applications	6.7, 9.4
26	Graphing Parabolas	9.5
27	Introduction to Complex Numbers and Complex Solutions to Quadratic Equations	9.6
28	Review	
	Departmental Final Exam – May 17, 2012 DATE SUBJECT TO CHANGE	