Algebra A Syllabus

Course Summary

This course is meant for students ages 11 to 14 who have completed, at a minimum, the Common Core (or equivalent) curriculum for Grade 7 coursework (PreAlgebra at EMC). Students will be exposed to the Focus Areas section listed below, and we expect students to master the skills listed in the Expected Outcomes section listed below.

Focus Areas at this Level

Concepts, skills, and learning tools students see in this course include, but are not limited to:

- Building fluency with more formal rules of algebra including isolating variables
- Introduction to functions: linear, quadratic, simple polynomial, and exponential
- Analysis of linear and quadratic equations through factoring, graphing and using different forms of the equations
- Introduction of sequences and series

Expected Outcomes

Students will be **expected to adequately perform in or explain** the following areas after course completion:

- Rewrite simple rational expressions in different forms
- Manipulate formulas/equations to highlight a quantity of interest
- Solve rational and radical equations in one or two variables, and recognize extraneous solutions
- Translate word problems into equations or inequalities with variables and solve for the variable(s)
- Solve systems of linear equations
- Graph linear and quadratic functions
- Interpret graphs of linear and quadratic functions
- Factor a quadratic expression to reveal the zeros of the function it defines
- Represent constraints of equations/inequalities, and of systems of equations/inequalities, and interpret solutions as viable or nonviable

Pre Requisites

Students registering for this course should be **comfortable with the following Math**:

- Pre-Algebra or equivalent
- Arithmetic with positive and negative numbers up to 1 billion and down to 1 billionth
- Comfortable with arithmetic operations with variables
- Comfortable with exponents and radicals
- Arithmetic by hand with at least 6-digit numbers
- Converting between fractions, decimals, and percentages
- Drawing and graphing points on a Cartesian plane

Students should also be **willing and able to**:

- Communicate in English at a beginner's level
- Be respectful of other students in their classes
- Practice writing things down on paper

- Share their thoughts with the instructors to help them discover solutions to their problems
- Take constructive criticism when it comes to their learning habits

Course Materials (Required)

- All classes will be taught online, via **Zoom**. Your student will need a device with a microphone and camera.
- Homework will be assigned via the textbook:
  - The Art of Problem Solving: Introduction to Algebra by Richard Rusczyk (2nd Edition)
  - Purchasable here: https://artofproblemsolving.com/store ; **Mandatory purchase** required
  - Physical or eBook contain the same problems
- Parents are expected to have read and understood the online Parent Handbook
  - Parents should review the expectations in class with their student(s)
  - Parents of this age group will need to help their students learn the technology used on the student's end

Students should also have access to:

- Calculator with x^2 and x^y (at a minimum)
- Paper (graph paper preferred), Pencils and Erasers
- Colored pencils or markers
- Reliable internet connection and digital device

Homework Expectations

Homework at EMC is set up to be flexible for the needs of your student. Usually we feel students fall into three general categories:

- EMC is **replacing public school or** accelerating my student for **testing out of Math** in the future
  - All Homework is **mandatory**
- EMC is helping **improve my grades** or **skills**
  - Homework is **highly recommended**, we recommend concentrating on school homework first
- EMC is for **interest's sake** and/or for **exposure** to problem solving **before seeing it in school**
  - Homework is **recommended, yet optional**

Homework Delivery

Homework is delivered in a two main ways:

- **Practice Homework**
  - Assigned through the Art of Problem Solving (AoPS) Textbook
  - PDFs of our lesson slides are posted weekly and include extra questions not assigned
  - AoPS has challenging questions and an alternate learning style compared to EMC, outlined below:
    - Problem Section
      - Questions designed to teach, read all these solutions if you're self-paced learning outside of the class times
    - Exercises
      - Questions to demonstrate understanding of the content ; we recommend not reading these solutions until after you have your first answer or get completely stuck

- **Assessment Homework** (aka Quizzes, Tests)
  - Canvas, set of questions to show instructors a student's understanding of the content
  - Auto-graded upon submission

- Instructors adjust grades after seeing results to give partial marks where appropriate, and plan to cover certain problem areas in the Homework Check portion of next class

Course Calendar

On yellow dates on the calendar below, no classes are held. Some days of the week (Sat, Sun, Mon) have less classes per year. These courses will have slightly condensed in-class schedules, and your instructor will let you know which homework assignments to do each week.

EMC SCHOOL

2026-2027 School Calendar

August 2026

M	Tu	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September 2026

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2026

M	Tu	W	Th	F	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 2026

M	Tu	W	Th	F	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December 2026

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2027

M	Tu	W	Th	F	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2027

M	Tu	W	Th	F	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2027

M	Tu	W	Th	F	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2027

M	Tu	W	Th	F	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2027

M	Tu	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June 2027

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

First and Last Day of School
School Holidays & Vacations

Aug 17	First Day of Classes
Sep 5 - 7	Labor Day Weekend - No Classes
Nov 23 - 29	Thanksgiving Week - No Classes
Dec 21 - Jan 3	Winter Break - No Classes
Apr 12 - 18	Spring Break - No Classes
May 29 - 31	Memorial Day - No Classes
Jun 13	Last Day of School

Course Itinerary

EMC Chapter	Lesson	Class Dates	AoPS Homework Assigned
Chapter 1: Math So Far	1) Advanced Operations	Aug 17- Aug 23	**Read 1.1 to 1.5 to review** **1.6 Exponents**: 1.6.1 to 1.6.6
	2) Radicals	Aug 24 - Aug 30	**1.7 Fractional Exponents:** 1.7.1 to 1.7.5 **1.8 Radicals**: 1.8.1 to 1.8.4
	3) Simplify, Evaluate and Solve	Aug 31 - Sept 6 OFF Sat Sept 5, Sun Sept 6 Labor Day	**2.1 Expressions**: Read, no problems **2.2 Arithmetic w/ Expressions**: 2.2.5 to 2.2.8 **2.3 Distrib., Sub. & Factoring**: 2.3.1 to 2.3.6 **3.1 Solving Linear Eq.I:** 3.1.1 to 3.1.4 **3.2 Solving Linear Eq.II:** 3.2.1 to 3.2.3
Chapter 2: Relations	4) Fractions	Sept 7 - Sept 13 OFF Mon Sept 7 Labor Day	**2.4 Fractions:** 2.4.1 to 2.4.5 **Ch.2 Review & Challenge**: 2.17 to 2.27
	5) Ratios and Percents	Sept 14 - Sept 20	**6.1 Basic Ratios:** 6.1.1 to 6.1.4 **6.2 More Challenging Ratios:** 6.2.1 to 6.2.4 **6.3 Conversion Factors:** 6.3.1 to 6.3.6 **6.4 Percent:** 6.4.1 to 6.4.5
	6) Proportions	Sept 21 - Sept 27	**7.1 Direct Proportion:** 7.1.1 to 7.1.4 **7.2 Inverse Proportion:** 7.2.1 to 7.2.3 **7.3 Joint Proportion:** Read, no problems
	7) Graphs of Relationships	Sept 28 - Oct 4	**7.4 Rate Problems:** 7.4.1 to 7.4.5 **EMC** provided homework
Chapter 3: The Simplest Function	8) Input Output Machines	Oct 5 - Oct 11	**16.1 The Machine: 16.1.1, & 16.1.3 to 16.1.6** **EMC** provided homework
	9) Graphing the Line	Oct 12 - Oct 18	**8.1 Number Line:** 8.1.1 to 8.1.4 **8.2 Graphing Linear Eq.:** 8.2.1 to 8.2.4 **8.3 Slopes:** 8.3.1 to 8.3.4
	10) Forms of the Line	Oct 19 - Oct 25	**8.4 Find the Equation:** 8.4.1 to 8.4.4 **8.5 Slope & Intercepts:** 8.5.1 to 8.5.6
	11) Changing Forms	Oct 26 - Nov 1	**Ch.8 Review Problems: 8.28 through 8.38**
Chapter 4: Systems	12) Substitution	Nov 2 - Nov 8	**5.1 Intro to 2-Var. Linear Eq.:** Read, no problems **5.2 Substitution:** 5.2.1 to 5.2.3
	13) Elimination	Nov 9 - Nov 15	**5.3 Elimination:** 5.3.1 to 5.3.3

of (Linear) Equations	14) Comparing Lines	Nov 16 - Nov 22	**8.6 Comparing Lines** - 8.6.1 to 8.6.5 **Review & Challenge** - 8.30 to 8.38
Holiday	**Thanksgiving**	**OFF** Nov 23 - Nov 29	**Have a great week!**
Chapter 5: Advanced Lines	**15) Is It Linear?**	Nov 30 - Dec 6	**3.4 Linear Eq. in Disguise**: 3.4.1 to 3.4.4 **5.5 More Lin. Eq. in Disguise:** 5.5.1 to 5.5.2
	16) Three Variable Systems	Dec 7 - Dec 13	**5.6 More Variables:** 5.6.1 to 5.6.4 **5.4 Word Problems:** 5.4.1 to 5.4.5
17) Midterm Review		Dec 14 - Dec 20	• Review of Chapters 1 through 5
Holiday	**Winter Break**	**OFF 2 WEEKS** Dec 21 - Jan 3	**Have a great break!**
Chapter 5: Advanced Lines	**18) Inequalities**	Jan 4 - Jan 10	**9.1 Basics:** 9.1.1 to 9.1.5 **9.2 Which is Greater?:** 9.2.1 & 9.2.2 **9.3 Linear Inequalities:** 9.3.1 to 9.3.4 **9.4 Graphing Inequalities:** 9.4.1 to 9.4.4
	19) Optimization	Jan 11 - Jan 17	**9.5 Optimization:** 9.5.1 to 9.5.5 **Ch.9 Review & Challenge:** 9.42, 9.44 & 9.45
Chapter 6: Quadratics	**20) What's a Quadratic?**	Jan 18 - Jan 24	**10.1 Getting Started:** 10.1.1 to 10.1.4
	21) Graphing and Finding Roots	Jan 25 - Jan 31	**10.1 Getting Started:** 10.1.5 **EMC provided homework**
	22) Factoring	Feb 1 - Feb 7	**10.2 Factoring Pt.I:** 10.2.1 to 10.2.4 **10.3 Factoring Pt.II:** 10.3.1 to 10.3.5
	23) Forms of Quadratics	Feb 8 - Feb 14	**14.1 Parabolas:** 14.1.1, 14.1.2, 14.1.4 to 14.1.6
Chapter 7: Advanced Quadratics	**24) Special Factoring Cases**	Feb 15 - Feb 21	**11.1 Squares of Binomials:** 11.1.1 to 11.1.5 **11.2 Difference of Squares:** 11.2.1 to 11.2.4 **11.4 Rationalizing Denom.:** 11.4.1 to 11.4.4
	25) Completing the Square	Feb 22 - Feb 28	**13.1 Sq. of Binomials Revisited:** 13.1.1 to 13.1.4 **13.2 Complete the Square:** 13.2.1 & 13.2.2
	26) The Quadratic Formula	Mar 1 - Mar 7	**13.3 The Quadratic Formula:** 13.3.1 & 13.3.2 ***Skip 13.4** **Ch.13 Review & Challenge:** 13.22, 13.23,

			13.27, 13.32, 13.37
27) Spring Review		Mar 8 - Mar 14	• Review of Chapters 5 through 6 • **Math Map** Where does this go?
Chapter 8: Quadratic Analysis	**28) Quadratic Inequalities**	Mar 15 - Mar 21	**15.1 Quadratic Inequalities:** 15.1.1 to 15.1.4
	29) Max and Min	Mar 22 - Mar 28	**15.3 The Trivial Inequality:** 15.3.1 to 15.3.3 **15.4 Quadratic Optimization:** 15.4.1 & 15.4.2
	30) Circles	Mar 29 - Apr 4	**14.2 Circles:** 14.2.1 to 14.2.3
Chapter 9: More On Functions	**31) Back to the Function**	Apr 5 - Apr 11	**16.1 The Machine:** 16.1.1, & 16.1.3 to 16.1.6 **16.2 Combining Functions:** 16.2.1 & 16.2.2 **16.3 Composition:** 16.3.1 to 16.3.4 **17.1 Basics:** 17.1.1 to 17.1.4
Holiday	**Spring Break**	**OFF** **Apr 12 - Apr 18**	**Have a great week!**
Chapter 9: More On Functions	**32) There...** **Transformations**	Apr 19 - Apr 25	**17.2 Transformations:** 17.2.1 to 17.2.3
	33) ...and Back Again **Inverse Functions**	Apr 26 - May 2	**16.4 Inverse Functions:** 16.4.1 & 16.4.2 **17.3 Inverse Functions:** 17.3.1 to 17.3.3 **Ch.16 Review & Challenge:** 16.26, 16.27, 16.31, 16.33, 16.44, 16.46
Chapter 10: Transforming Functions	**34) Exponential Functions**	May 3 - May 9	**EMC** provided homework
	35) Exponential Transformations	May 10 - May 16	**EMC** provided homework
	36) Higher Order Polynomials	May 17 - May 23	**EMC** provided homework
	37) Higher Order Transformations	May 24 - May 30 **OFF Sat Sun May 29 and 30** **Memorial Day**	**EMC** provided homework
Bonus Lesson	**38) Sequences and Series**	May 31 - June 6 **OFF Mon May 31** **Memorial Day**	**EMC** provided homework
39) Final Review		June 7 - June 13	• Review of Chapters 6 through 9