City of Seattle Upward Bound @ Seattle University, Summer 2018

Course: Algebra II   **Teacher: Alex V. Thayer**

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Course Summary:

- This six-week course is designed to teach the concepts necessary for success in a year-long high school Algebra II class using the application of critical thinking skills, active learning, cooperative learning, real-life applications, one-on-one assistance, and a culminating project. This comprehensive course is aligned with the Common Core State Standards, Mathematics Content Focus Algebra II.

- Topics covered include algebraic expressions, linear functions and systems, absolute value, transformations of graphs, quadratics, higher degree polynomials, exponent rules, exponential equations, and probability.

Resources:

- *Discovering Advanced Algebra* (2nd ed), Key Curriculum Press, 2010.
- *Algebra 2*, Prentice Hall, 2007.
- *Algebra with Pizzazz*, Wright Group / McGraw-Hill, 2002.
- *MIRL Making Math Real*, Online Activity Library, 2008.
- freemathhelp.com
- ixl.com
- khanacademy.org
- math.com

Structure of Daily Lessons:

- Each day of class students will split into synergy groups to work on the lesson of the day. Lessons are divided into Basic, Intermediate, and Advanced sections. Depending on group performance and class time, some days we may only complete the Basic section while others we may finish most of the Advanced section.

- Each group will be asked to have a student present a few of the problems that they complete to the whole class. Students who finish work early are encouraged to help each other and in turn gain an even stronger understanding themselves. Think win-win.

- The Basic section of each lesson must always be completed (and this will be checked for a grade), but if Intermediate or Advanced sections are left unfinished it is up to the student to be proactive and choose to sharpen the saw. Files will be posted at *alexthayer.net/ub/alg2/* for students wishing to check their understanding.

- There are 20 planned daily lessons. If field trips or other events prevent us from getting to all of them, we may omit one or more of them. If we have extra class days, they may be used for continued work on Intermediate and Advanced sections students have not completed.

List of Planned Lessons:

1. Numbers, Expressions, and Equations
2. Functions, Tables, and Graphs
3. Linear Equations
4. Systems of Linear Equations
5. Transformations of Functions
6. Introduction to Quadratics and Polynomials
7. Factoring by GCF
8. Factoring Simple Quadratics
9. Factoring Harder Quadratics
10. Completing the Square and Vertex Form
11. Factoring Polynomials
12. End Behavior of Polynomials
13. Introduction to Rational Functions
14. Exponent Rules
15. Power Functions vs. Exponential Functions
16. Applications of Exponential Functions
17. Introduction to Logarithms
18. Introduction to Trigonometric Functions
19. Introduction to Complex Numbers
20. Introduction to Probability

Washington State Common Core Standards:

- **The Real Number System (N-RN)**
  - Extend the properties of exponents to rational exponents.
- **The Complex Number System (N-CN)**
  - Perform arithmetic operations with complex numbers.
  - Use complex numbers in polynomial identities and equations.
- **Seeing Structure in Expressions (A-SSE)**
  - Interpret the structure of expressions.
  - Write expressions in equivalent forms to solve problems.
- **Arithmetic with Polynomials and Rational Expressions (A-APR)**
  - Understand the relationship between zeros and factors of polynomials.
  - Use polynomial identities to solve problems.
  - Rewrite rational expressions
- **Creating Equations (A-CED)**
  - Create equations that describe numbers or relationships.
- **Reasoning with Equations and Inequalities (A-REI)**
  - Understand solving equations as a process of reasoning and explain the reasoning.
  - Solve equations in one variable.
  - Solve systems of equations.
  - Represent and solve equations and inequalities graphically.

- **Interpreting Functions (F-IF)**
  - Understand the concept of a function and use function notation.
  - Interpret functions that arise in applications in terms of the context.
  - Analyze functions using different representations.
- **Building Functions (F-BF)**
  - Build a function that models a relationship between two quantities.
  - Build new functions from existing functions.
- **Linear, Quadratic, and Exponential Models (F-LE)**
  - Construct and compare linear, quadratic, and exponential models and solve problems.
  - Interpret expressions for functions in terms of the situation they model.
- **Trigonometric Functions (F-TF)**
  - Extend the domain of trigonometric functions using the unit circle.
- **Conditional Probability and the Rules of Probability (S-CP)**
  - Use the rules of probability to compute probabilities of compound events in a uniform probability model.

Grading System:

- **Basic Daily Lessons (25%)**
  - You are expected to show me that you have completed the Basic section of each day's lesson within a timely manner. If you expect to be absent, please plan in advance to complete the worksheet.
  - While group work is expected, you should ensure that you are not merely copying from someone else or letting someone copy from you. The goal is to understand the lesson so that you are prepared for your coming year of school.
  - 2 out of 2 points for completing a basic lesson; only 1 point for partial completion
- **Participation (25%)**
  - You are encouraged to help everyone in your group get through the worksheet.
  - Do not use phones or headphones during class as they are a distraction.
  - Everyone begins a class day with 2 participation points but may lose 1 or both if they are off-task or otherwise disrupt learning.
- **Quizzes (25%)**
  - There will be several short quizzes throughout the summer. They will be taken during the first 10 minutes of class, so please arrive on-time every day.
  - Each quiz will consist of only 2 questions: a concept question and an example.
  - For the concept question, you will be asked to give a mathematically accurate explanation for how something works. For example, "explain how to multiply two linear binomials". This question will be worth 4 points.
  - The example question is more like a traditional math problem, and it will relate to what you were asked to explain in the concept question. It will be worth 6 points.

- o If you would like to re-take a quiz, please let me know. You may arrange to re-take it on another date (as long as we don't have another quiz scheduled for that date). Example problems will be different from originals on re-takes.
- **Culminating Project (25%)**
  - o The culminating project for this course will be a pamphlet that demonstrates what you learned about two math topics during the summer.
  - o A list of potential topics and a full description and rubric will be passed out about halfway into the summer so you may begin thinking about your topic then.
  - o We will spend 2 days in a computer lab to create this pamphlet, where you are expected to be on your best behavior.

Your final average will be rounded to the nearest integer percentage and assigned a letter grade according to the following scale:

	A = 93 − 100	A- = 90 − 92
B+ = 87 − 89	B = 83 − 86	B- = 80 − 82
C+ = 77 − 79	C = 73 − 76	C- = 70 − 72
D+ = 67 − 69	D = 63 − 66	D- = 60 − 62
	F = 0 − 59	

Integration of 7 Habits:

- **Be proactive** in studying and asking questions.
- **Begin with the end in mind** that you will succeed in your next math course when you return to school in the fall.
- **Put first things first** when rationing time between studying and other activities.
- **Think Win-Win** and cement your own understanding of math by helping others.
- **Seek first to understand** what the lesson or another student is explaining before composing your own response to that topic.
- **Synergize** with your classmates and solve math problems together.
- **Sharpen the saw** by taking advantage of the Intermediate and Advanced sections of each lesson and preparing yourself even better for the year ahead.

Homework:

As mentioned above in the Grading System, there is nothing specifically called "Homework", but you are expected to complete the Basic Daily Lessons, fully participate in class, prepare yourself for quizzes, and complete and present your final project.

Absences and Late Assignments:

If you are absent, you must be given the same number of days you were gone from school to turn in missing work for full credit. Assignments completed later than this time must be accepted at 50% credit. If you missed or expect to be missing class, I encourage you to contact me by e-mail and check the website for any new files.