

NWCS Summer Pre-Algebra

Time: 10:00 - 12:00 a.m. Monday, Wednesday, and Friday

Number of Session: 8 (6/20, 6/22, 6/24, 6/27, 6/29, 7/1, 7/6, 7/8)

Overview:

This Pre-Algebra course is designed for students in late elementary school to build upon and strengthen their skills on the math concepts they have learned in prior years to prepare them for Algebra. Upon completion of this course, students will be ready to tackle NWCS Basic Algebra.

Structure:

Each 2-hour class session will be organized in the following format:

1. Warm-up/Homework Review (20 minutes)
2. Quiz (10 minutes)
3. Lesson Part 1 (30 minutes)
4. Break (10 minutes)
5. Lesson Part 2 (30 minutes)
6. Class Activity/Practice (20 minutes)

Textbook:

Steck-Vaughn Core Skills Mathematics: Workbook Grade 5

Topics:

This course will cover, but are not limited to, these topics:

Week 1 (Class 1-3)

- Diagnostics
- Whole Numbers
- Fractions
- Decimals
- Ratios
- Averages
- Percentages
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Week 2 (Class 4-6)

- Area and perimeter of Triangles and Quadrilaterals
- Area and circumference of Circles
- Volume
- Angles and lines
- Sum of Triangles and Quadrilaterals
- Basic Polygons
- Course Comprehensive Review
- Application Based Individual and Team Projects

Week 3 (Class 7-8)

- Review, Practice, Review



NWCS Summer Advanced Algebra for Middle School

Time: 10:00 a.m. - 12:00 p.m. Monday and Thursday.

Number of Session: 8 (7/11, 7/14, 7/18, 7/21, 7/25, 7/28, 8/1, 8/4)

Advanced Algebra for Middle School is designed to help students to review and deepen the understanding of middle school Algebra. It targets the students who finished the Enrichment 4-Algebra class and/or who have the basic knowledge of Algebra. The class size will be limited to 12 students with the intention of creating more opportunity for classroom discussion and teacher-student interaction.

The purpose of the class is three folded:

- 1) provide a thorough review of the most important Algebra concepts learned in the past one year.
- 2) challenge the student with more advanced algebraic problems.
- 3) enhance the problem-solving skill by intensive in-class exercise and group discussion.

Organization

The 2 hours class will be typically ordered in the following way.

- Quiz (5-10 minutes)
- Discuss the homework and quiz (15- 20 minutes)
- New lecture (50- 60 minutes)
- Classroom exercise and group discussion (30-40 minutes)

Textbook:

The class teaching material is based on the "New Elementary Mathematics 2" by Singapore Math - http://www.singaporemath.com/New_Elem_Math_Textbk_2_p/nemt2.htm.

This is the same book used for the Enrichment Math 4- Algebra. Additional study material will be provided by the teacher.

Sessions

This 4-week course will cover the following topics:

Session 1: One-variable linear equation and its application to solve real problem.

Session 2: Algebraic operation, Algebra manipulation - expanding and factorization.

Session 3: Exponents and Indices

Session 4: One-variable quadratic equation and its application to solve real problem.

Session 5: Rate, Ratio, Percentage, and their application in financial transaction

Session 6: System of equations and its application

Session 7. The X-Y coordinate plan; Linear and quadratic equation in graph

Session 8: Solving inequity



NWCS Summer Advanced Geometry for Middle School

Time: 7:00 p.m. – 9:00 p.m. Tuesday and Friday

Number of Sessions: 8 (7/19, 7/22, 7/26, 7/29, 8/2, 8/5, 8/9, 8/12)

Advanced Geometry for Middle School is designed to help students to review and deepen the understanding of middle school Geometry. It targets the students who already have the basic knowledge of Geometry. The class size will be limited to 12 students with the intention of creating more opportunity for classroom discussion and teacher-student interaction.

The purpose of the class is three folded:

- 1) provide a thorough review of the most important Geometry concepts
- 2) challenge the student with more advanced problems.
- 3) enhance the problem-solving skill by intensive in-class exercise and group discussion.

Organization

The 2 hours class will be typically ordered in the following way.

- Discuss the homework (20 minutes)
- New lecture (80 minutes)
- In class practice/group project/quiz (20minutes)

Textbook:

The class teaching material is partially based on the "New Elementary Mathematics 2" by Singapore Math -

http://www.singaporemath.com/New_Elem_Math_Textbk_2_p/nemt2.htm.

Additional study material will be provided by the teacher.

Session

This 4-week course will cover the following topics:

Session 1: Basic of geometry

Session 2: Congruent Triangles

Session 3: Similar Triangles

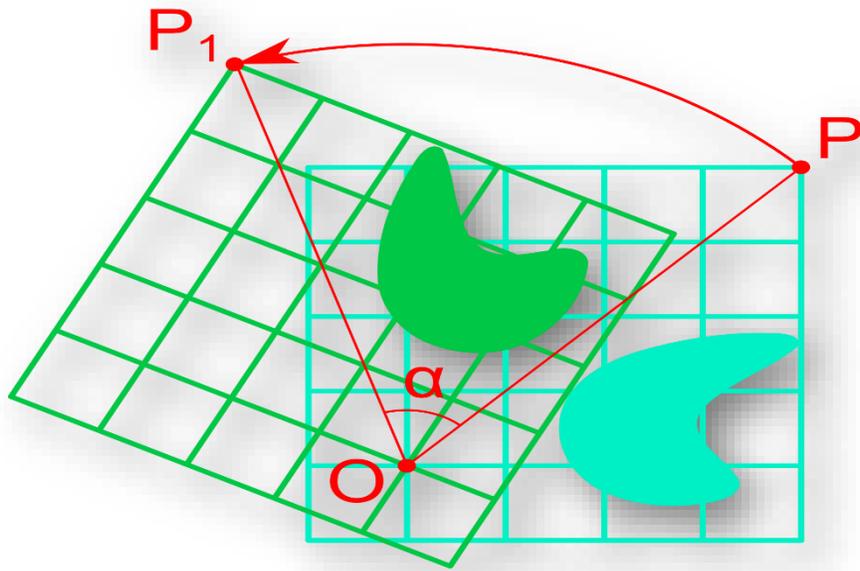
Session 4: Quadrilaterals/Polygons

Session 5: Solid Figures

Session 6: Right Triangle and trigonometry

Session 7: Motion Geometry

Session 8: Circles



NWCS Summer Advanced Algebra 2 for Middle School

Time: 7:00 p.m. - 9:00 p.m. Wednesday & 10:00 a.m. - 12:00 p.m. Saturday

Number of Sessions: 8 (8/3, 8/6, 8/10, 8/13, 8/17, 8/20, 8/24, 8/27)

Algebra II builds on the skills and concepts you learned in Algebra I. One of the key concepts is the idea of functions: functions are fundamental building blocks for the development of higher mathematics. It targets the students who finished Enrichment 4-Algebra. It is more advanced, and it prepares students for high school.

This class is:

- 1) designed to help students review, improve, and build stronger math foundations.
- 2) challenge the student with more advanced problem beyond Algebra.
- 3) enhance the problem-solving skill by intensive in-class exercise and group discussion.

Organization

The 2-hour class will be typically ordered in the following way.

- Quiz (5-10 minutes)
- Discuss the homework and quiz (15- 20 minutes)
- New lecture (50- 60 minutes)
- Classroom exercise and group discussion (30-40 minutes)

Textbook:

The class teaching material is based on the "Algebra II" by McGraw Hill.

A screenshot of the cover page of the textbook is attached.

Sessions

This 4-week course will cover the following topics:

Session 1: Linear equation and inequalities

Session 2: Quadratic relationships

Session 3: Complex numbers

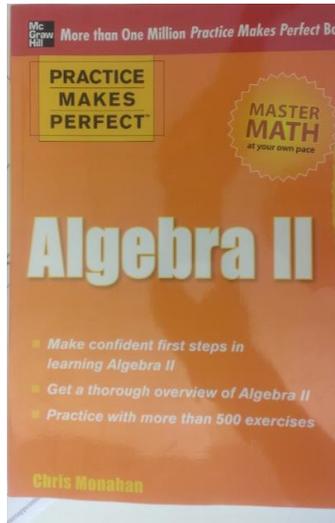
Session 4: Polynomial functions

Session 5: Relational and irrational functions

Session 6: Exponential and logarithmic functions

Session 7. Sequences and series

Session 8: Introduction to probability



NWCS Summer Math Olympiad (AMC 8) Training Class

Time: 9:00 am to 12:00 pm Weekday (M, T, W, Th, F)

Number of Sessions: 10 (7/11 – 7/22)

Purpose

We intend to provide a training opportunity to students who want to get ready for a national math competition, i.e., AMC 8. (<http://amc.maa.org/e-exams/e4-amc08/amc8.shtml>).

The program takes 10 days. Training material will be within the scope of AMC 8.

- Short-term Goal:
Help students to improve their performance (scoring) in AMC 8.
- Long-term Goal:
Help students who have great passion to learn fundamental math concepts and are eager to expose themselves to challenging problem-solving world at the level of elementary to middle school.

Students:

Students who have previously taken MO1 (Math competition for beginners from NWCS) or equivalent knowledge. The most important thing is student's curiosity and passion to learn.

Course Plan:

Day 1 – Number Sense and Number Theory

Day 2 – Fraction, Ratio and Proportion

Day 3 – Basic Geometry

Day 4 – Basic Algebra

Day 5 – Interim Review and Practice

Day 6 – Counting and Number Series

Day 7 – Probability and others

Day 8 – Comprehensive

Day 9 – Potpourri

Day 10 – AMC 8 test simulation & award

Every day we follow basic teaching principle:

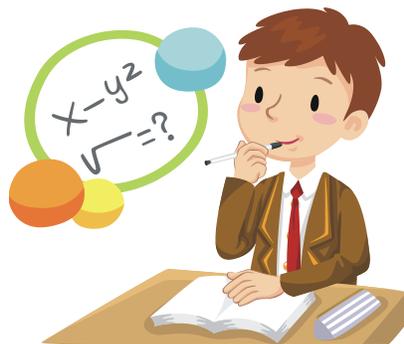
- Give students preview of what they expect to learn for the day, in order to warm up the class;
- Teach students step by step using the simplest language, and have the students practice when they learn.
- Emphasize again what teacher has taught for the day and give students more challenges as needed.

Detailed sequence:

1st hour - Introduce basic concepts, explain in-depth of techniques in specific areas.

2nd hour - Provide students hands on opportunity, teacher gives guidance and helps students diagnose their mistakes to improve learning results.

3rd hour - Reiterate fundamental concepts from different perspectives, summarize what have been taught.



NWCS Summer Math Olympiad (AMC 10/12)

Time: 7:00pm - 9:00pm Monday, Wednesday, Friday

Number of Sessions: 6 (dates: 8/15, 8/17, 8/19, 8/22, 8/24, 8/26)

Purpose

In past years, we have seen many advanced students struggling to solve challenging problems on the AMC 10/12 (<https://www.maa.org/math-competitions/amc-1012>). The AMC 10/12 is now in November, and we hope to provide students with a jump start on preparation before the school year begins. This class is a systematic training program that will help students achieve the excellent performance that they well deserve on the AMC 10/12.

Students:

There are no restrictions on students' grade levels; this class is ideal for students planning to take the AMC 10/12 this Fall.

Course Plan

The training program will take 6 sessions to thoroughly and intensively cover advanced problem-solving techniques, strategies, and content knowledge to boost students' AMC 10/12 performance.

Day1: Algebra – polynomials, equations with radicals, sequences & series, etc.

Day2: Geometry – trigonometry, common formulas, mass points technique, etc.

Day3: Number Theory – primes & divisibility, base numbers, modular arithmetic, etc.

Day4: Combinatorics – binomials, stars & bars, principle of inclusion/exclusion, recursion, etc.

Day5: Critical Problems – problem solving strategies, test-taking tips

Day6: Error Analysis – common mistakes and how to avoid/catch them

Course Instructor:

The instructor of this course is an experienced math competition participant, having earned perfect scores on both the AMC 10 and the AMC 12, and qualified for the AIME seven times. He is a USAJMO Winner and two-time Math Olympiad Program (top 60 in nation) participant.

NWCS Summer Python Programming Course Intermediate level

Time: 10:00 a.m. – 12:00 p.m. Saturday and 6:30 p.m. – 8:30 p.m. Wednesday

Number of Sessions: 8 (8/3 - 8/27)

Overview:

The purpose of this course is to introduce the basic concepts and tools for Python programming and apply Python (version 3.x) and Jupyter Notebook tool to basic data analysis projects. Students need to have a basic programming knowledge (i.e. Java basic, etc.) in order to be qualified to take this course.

Structure:

Each 2-hour class session will be organized in the following format:

1. Warm-up/Homework Review (20 minutes)
2. Quiz (10 minutes)
3. Lesson Part 1 (30 minutes)
4. Break (10 minutes)
5. Lesson Part 2 (30 minutes)
6. Hands on Practice (20 minutes)

Topics:

This course will cover, but are not limited to, the following topics:

1. Fundamental tool set for Python development and its library support
2. Data type, Input / Output and Logic Control
3. Data Collection, Processing, and analysis
4. Basic Algorithms and Data Structures
5. Text data processing and introduction of basic NLP
6. Modeling 101 with Python
7. Hands on project experience
8. Hands on project experience & Final review

