Invention Math Academy

Online Mathematics courses
Spring semester 1/10/ to 5/17
Our goal is to provide an extra curriculum to strengthen the math foundation.
Lecture recording and notes will be available to students in google classroom

Course Registration: inventionmath.org

Contact Email: hungzen@inventionmath.org

Sunday Course
Date: 1/11, (No class 1/18), 1/25, 2/1, 2/8, (No class on 2/15), 2/22, 3/1,
3/8, (No class on 3/15), 3/22, 3/29, (No class 4/5) , 4/12, 4/19, 4/26, 5/3, 5/10, 5/17
Totally 15 courses

Course/ Instructor	Lecture Time(Sunday)	Prerequisite	Tuition
02B--Math Dr. Hungzen Liao	PM 6:00--7:00(central time)	Complete Singapore math 2 or equivalent material	$330
03B--Math Dr. Wei Yang	PM 4:00--5:00(central time)	03A--Math	$330
04B--PreAlgebra Ms. Chen Li	PM 3:00--4:00(central time)	04A--Math	$330
05B--Algebra Mr. Tom Weng	PM 4:00--5:00(central time)	05A--PreAlgebra	$330
06B--Algebra Ms. Chen Li	PM 4:30--5:30(central time)	06A--Algebra	$330

07B--Algebra Dr. Qiang Zhao	PM 3:00--4:00(central time)	07A--Algebra	$330
08B--Algebra Dr.Hungzen Liao	PM 3:00--4:00(central time)	08A--Algebra	$330
AP Calculus Dr. Hungzen Liao	PM 4:30--5:45(central time)	Particular class for Intense practice	$345
08B--Mathcounts/AMC Dr. Wei Yang	PM 5:30--6:45(central time)	NA	$420

Course Instructors(more detail in the website):

Dr. Qiang Zhao (07-Algebra, 09-PreCalculus) – Mathematics Professor at Texas State University

Ms. Chen Li (04-PreAlgebra, 06-Algebra) **--** 18 years of teaching experience, "Teacher of the Year" Award (2021) at a public middle school in Austin.

Dr. Hungzen Liao (02-Math and Reasoning, 08-Algebra, 10-Calculus) – Over 15 years of teaching experience at a private high school and college in Austin

Dr. Wei Yang (03- Math and Reasoning, 07--Mathcounts/AMC) – Clements high school math teacher. Over 15 years of teaching experience at university and private school.

Mr. Weng (05-Algebra, 08-Algebra) – 20 years of college math teaching experience, coaching students for engineering and computer science majors.

Dr. Wenbin Luo(Python Programming I) –Professor of Computer Engineering. He has 18+ years of experience in teaching programming and robotics camps to K-12 students.

Payment info: Please write students' name and order number in memo
Early bird discount $15 if the registration completes before 12/31.
Sibly discount $15 for enrolling more than 3 students.
Referral credits $15 for each referral.(You can use it for future classes. Need to provide student's name referred in memo or message me in the wechat)

1..Zelle account (prefer): hungzen@gmail.com	2.Venmo(last 4 digits of phone 8194) https://venmo.com/u/hungzen
Scan in your banking app to pay HUNG at h...n@gmail.com. Zelle®	3.Paypal https://www.paypal.me/HungzenLiao973

DSM Course Description:

02- Math
This is a one-year enhancement course recommended for students in 2nd grade. Semester 1 will cover: Numbers to 1000, Addition, Subtraction, Multiplication, Division, Time, and Money. Semester 2 will cover Review multiplication table and application, Fractions, Patterns, Length, Weight, Volume, Geometry, Data and graph, Problem solving.

03- Math
This is a one-year enhancement course recommended for students in 3rd grade. Semester 1 will cover Number sense, Properties, Fractions. Semester 2 will cover Fractions, Decimals, Geometry, Units of measurement, Data and graphs. Prerequisite: 02-Math and Reasoning or approved by Dr. Liao.

04-PreAlgebra (1st Semester: 04A-PreAlgebra, 2nd Semester: 04B-PreAlgebra)

This is a one-year enhancement course recommended for students in 4th grade. The course will cover the following topics: comparing integers, operations of integers (+,-,X,/), fractions, operations of fractions (+,-,X,/), solving one-step and two-step equations, divisibility rules, measurement, geometry (angle measure, perimeter and area), patterns and sequences. Prerequisite: 03-Math and Reasoning or approved by Dr. Liao.

05-Algebra (1st Semester: 05A-Algebra, 2nd Semester: 05B-Algebra)

This is a one-year enhancement course recommended for students in 5th grade. The course will cover many topics taught in Texas middle schools. Topics (two semesters) include fraction, operations of fractions, equation with fractions, rounding decimals, linear equations and inequalities with decimal coefficients and fractions, mean median and mode, radical, exponent, least common multiple(L.C.M), prime factorization of integers, percentage change (increase/decrease), ratio, direct proportion, inverse proportion, markup, discount, scale drawing, speed-distance problems, rectangular coordinate system, point, line segment, square root of whole numbers, Pythagorean theorem, area of triangle, box-method. The course will also teach mental mathematics and will enhance student mental calculation skills in arithmetic. Students will spend 5 minutes in each class practicing mental mathematics skills. Prerequisite: 04-PreAlgebra or approved by Dr. Liao.

06-Algebra (1st Semester: 06A-Algebra, 2nd Semester: 06B-Algebra)

This is a one-year enhancement course recommended for students in 6th grade. Topics (two semesters) include distance formula, midpoint formula, graph of a linear equation, equation of a line, intercepts, slope, slope-intercept formula, point-slope formula, graphing, parallel lines, perpendicular lines, system of linear equations, simple and compound interest, financial applications, population growth, linear inequality, system of linear inequalities, triangle inequality theorem, absolute value equation, absolute value inequality, polynomial, operations of polynomials, FOIL expansion, factoring a polynomial, factoring trinomials of the type ax^2+bx+c. Prerequisite: 05-Algebra or approved by Dr. Liao.

07-Algebra (1st Semester: 07A-Algebra, 2nd Semester: 07B-Algebra)

This is a one-year enhancement course recommended for Students in 7th grade. Topics (two semesters) include solving complicated equations in one variable, quadratic equation, completing square, quadratic formula, discriminant, quadratic type equation, systems of linear and quadratic equations, linear inequality, quadratic inequality, polynomial inequality, integer exponent, quadratic and exponential functions, long division, synthetic division, operations of rational expressions (+,-,X,/), data analysis, least common denominator, rational function, rational equation, equation with compound rational expression, radical expressions, radical equations, rational exponent, relation between rational exponents and radicals, radical equation. Prerequisite: 06-Algebra or approved by Dr. Liao.

08-Algebra (1st Semester: 08A-Algebra, 2nd Semester: 08B-Algebra)

This is a one-year enhancement course recommended for Students in 8th grade. Topics (two semesters) include complex number, operations of complex numbers (+,-,X,/), complex conjugate, review of linear and quadratic functions and their properties, graph transformation, polynomial function and graph, division algorithm, remainder theorem, factor theorem, rational zeros of a polynomial function, conjugate pairs theorem, complex zeros of a polynomial function, irrational zero theorem, radical function, piecewise-defined function, vertical, horizontal, and slant asymptotes of a rational function, polynomial inequalities, rational inequalities,

inverse function, exponential function, logarithmic function, equation on exponential functions, equation on logarithmic functions, Sequences, sum of an arithmetic sequence, sum of a geometric sequence. Prerequisite: 07-Algebra or approved by Dr. Liao.

06-Geometry, 07-Geometry

This is a one-year enhancement course for high school Geometry. Geometry is the study of points, lines, surfaces, shapes, 3-dimensional solids, and the relationships that exist between them. Topics (two semesters) include elements of plane geometry, reasoning and proofs, transforming figures, triangles and geometric constructions, congruent triangles, similar triangles, polygons, circles, three-dimensional figures, and circle theorems. Prerequisite: 06-Algebra (Fall) or approved by Dr. Liao. This course is recommended for students in 6th, 7th, 8th grades.

06-MathCounts/AMC, 07-Mathcounts/AMC

This is a one-year course preparing middle school students for success on MathCounts and the AMC 8 tests. Prerequisite: 05-Algebra or approved by Dr. Liao. This course is recommended for students in 6th, 7th grades. Students are recommended to take 06-MathCounts/AMC and 06-Algebra at the same time. Topics include mental mathematics, digit root, operation puzzles, number puzzles, continued fractions, properties involving fractions, operations with decimals, repeating decimals, converting repeating decimals to fractions, operations with repeating decimals, operations with percent and interest, problems on fractions, rates, ratios, and continued ratios, mean-median problems, distance-speed problems, substance-concentration-dilution problems, pattern and odd/even parity problems, floor/ceiling functions, modular arithmetic, finding last digits, floor/ceiling equations, exponential equations, Venn diagram, inclusion-and-exclusion problems, counting rules, the Pythagorean theorem, perimeter and area problems.

08-MathCounts/AMC

This is a one-year advanced course preparing middle school students for success on MathCounts and the AMC 8 tests. Prerequisite: 06-MathCounts/AMC or approved by Dr. Liao. This course is recommended for students in 7th, 8th grades. Students are recommended to take 08-MathCounts/AMC and 07-Algebra at the same time. Topics include fractions and repeating decimals, repeating patterns, infinite geometric series, applications of Vieta's theorem, converse problems, inclusion-and-exclusion, permutations and combinations, mixed problems on permutation and combination, generalized permutations and combinations, counting geometric figures, discrete probability, probability distribution, independence of events, complicate radical equations, complicated absolute equations, system of equations, Cramer's rule, non-linear equations, non-linear algebraic techniques, binary, octal, and hexadecimal number systems, converting repeating decimal between different number systems, inequalities in geometry, problem solving techniques using area, problem solving techniques using similar triangles, triangle midsegment, hard problems involving area.

10/12-AMC (2-year course stacked for 10-AMC and 12-AMC)
This is a topic-based problem-solving course preparing high school students for success on the AMC 10/12 tests. Topics covered will be different for any two consecutive years, and thus students can take the course for up to two years. Prerequisite: 08-MathCounts/AMC or approved by Dr. Liao. This course is recommended for students in 8th, 9th, 10th grades. Topics for the 2020-2021 year (Fall and Spring semesters) include 4-step research procedure (pattern -> guess -> conjecture -> proof) in mathematical problem solving, divisibility, divisors, the Euclidean algorithm, Diophantine's equations, Fermat numbers, Euler's function, Fermat little theorem, Wilson's theorem, proof strategies, induction, strong induction, proof by contradiction, research problems and talks, linear congruence equations, system of linear congruence equations, Chinese remainder theorem, applications of Chinese remainder theorem, non-linear congruence equations, factorial function and prime factors, tangle lines of a circle, geometric constructions, power of a point theorem, inequalities in mathematics competition. Topics for the 2021-2022 year will be completely different.

09-PreCalculus (1st Semester: 09A-PreCalculus, 2nd Semester: 09B-PreCalculus)
This is a one-year enhancement course for high school Pre-Calculus. Topics include (two semesters) overview of functions and graphs, trigonometry, trigonometric equations, identities, inverse trigonometric functions, complex numbers, exponential forms of complex numbers, De Moivre's Theorem, vectors, polar equations, parametric equations, dot and cross product, conic sections, probability, statistics and matrices.

10-Calculus (1st Semester: 10A-Calculus, 2nd Semester: 10B-Calculus)
This is a year-long calculus class. Topics include concepts of limit, continuous functions, Intermediate Value Theorem, the definition of the derivative, properties of the derivative, rules of the derivative, tangent lines equations, derivative exponential, logarithm and trigonometric functions, the implicit derivative, the derivative of the inverse functions, L'Hopital rule and the applications including increasing or decreasing interval of functions, extreme value, concavity, points of inflection and curve sketching. The topics in the second semester include Riemann sum, definite integrals, properties of integration, basic rules of integration, Fundamental theorem of calculus, integration by substitution, area bounded by curves and disk/washer method.

Python Programming I
Python is one of the most popular programming languages among data scientists and machine learning researchers. It is a perfect language for students to learn fundamental programming skills and concepts. In this course, students will not only build solid programming skills, but also master Python specific features. Topics include, but are not limited to the following: variables, expressions, statements, conditional execution, functions, iteration, and strings. Python programming is ideal for students 11 to 19 years old.