

## Welcome to Jesuit High School's Math Community!

Jesuit invites middle school and high school students to join a math community where they can collaborate and develop their mathematics, problem-solving, and communication skills. The program aims to:

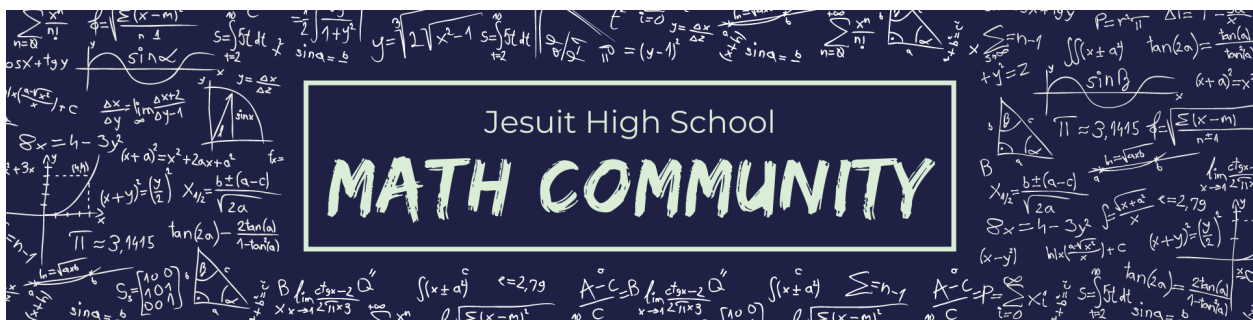
- Enhance a student's performance in their regular math class
- Provide opportunities to explore interesting topics beyond what is usually covered in a school's curriculum
- Assist students seeking to progress to a higher level of mathematics
- Support students interested in preparing for mathematics and science competitions
- Create a setting for advanced math students to explore STEM fields

Jesuit High School's Math Community courses are virtual and conducted in real-time. Students participate in discussion-based lectures and collaborate to solve problems. Students are asked to participate with their video cameras on during the class period.

2023 online Autumn Session courses include:

- [#097 Problem-Solving with Prealgebra: Ratios & Percents](#)
- [#115 Problem-Solving with Algebra: Variables, Expressions, & Equations](#)
- [#135 Geometry Part One: Logic, Lines, and Congruence](#)
- [#141 Problem-Solving with Algebra 2: Functions](#)

Questions? Please email questions to [onlinelearning@jesuitportland.org](mailto:onlinelearning@jesuitportland.org).



## #097 Problem-Solving with Prealgebra: Ratios and Percents

9/16-11/18 (10 Saturdays)

Zoom, 9:30 - 11 AM

\$235 (\$210 through 9/8)

**Description:** This course is for students who seek a deep understanding of numbers as they acquire skills necessary for advancement to Algebra 1. This course also offers fun puzzle-solving challenges to current Algebra 1 students. Students will strengthen mathematical skills and intuition through conversation, problem-solving, and mathematical puzzles. Topics include **ratios, proportions, conversions, rates, speed, and percentages**. Students should expect 30 minutes of homework per class.

**Prerequisites:** Students should have the ability to apply operations (addition, subtraction, multiplication, and division) on multi-digit numbers, negative numbers, fractions, decimals, and variables; and a willingness to work on word problems that involve more than one step. The course is a good choice for a student who can answer **22 or more** of the problems on [this placement quiz](#) (some questions have multiple problems). The problems below are examples of discussion topics for the course. They are not prerequisites.

### Challenge 1

The ratio of boys to girls at a summer camp is 4 to 5. If the total number of students at the camp is 108, then how many boys are at the camp?

### Challenge 2

Roger can shovel his family's driveway in 1 hour. His older sister Alexis can shovel the driveway in  $\frac{1}{2}$  an hour. If they work together, then how long will it take them to shovel the driveway?

### Challenge 3

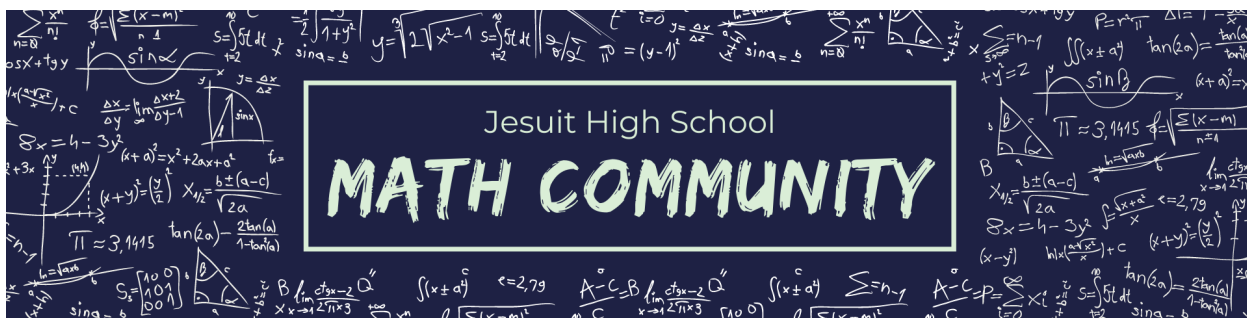
Working alone, Jamie can mow her lawn in 75 minutes. If Bob helps her, then the two can mow the lawn in 30 minutes. How long does it take Bob to mow the lawn alone?

### Challenge 4

Given that one pound is sixteen ounces, what is the ratio of 1 pound, 4 ounces to 3 pounds, 10 ounces (*from MATHCOUNTS*).

### Challenge 5

On a map, two mountains are  $5\frac{7}{8}$  inches apart. If  $\frac{1}{2}$  of an inch on the map represents 80 miles, then how many miles apart are the two mountains?



## #115 Problem Solving with Algebra: Variables, Expressions, & Equations

9/16-11/18 (10 Saturdays) Zoom, 11:15 AM - 12:45 PM

\$235 (\$210 through 9/8)

**Description:** Students in this class will develop a foundation of basic tools that will be instrumental in mastering algebra. Students will solve one-variable linear equations. Students will work to develop fluency with variables, expressions, and equations by working with **multi-variable expressions, arithmetic with variables, distribution, factoring, and fractions with variables**. The course will introduce **adding, subtracting, and simplifying rational expressions**, which are some of the concepts students find most challenging to master in Algebra 1. Students should expect 30 minutes of homework per class.

**Prerequisite:** This class is for students with solid prealgebra skills who can successfully complete this [placement quiz](#). The problems below are examples of discussion topics. They are not prerequisites.

### Challenge 1

Evaluate  $\frac{t^5}{t^3}$  when  $t = -7$ .

### Challenge 2

Solve  $4 - 2r = 17 + 5r$ .

### Challenge 3

My brother is 4 times as old as I am. Six years from now, he will be twice as old as I will be. How old is my brother now?

### Challenge 1

Write as a single fraction:

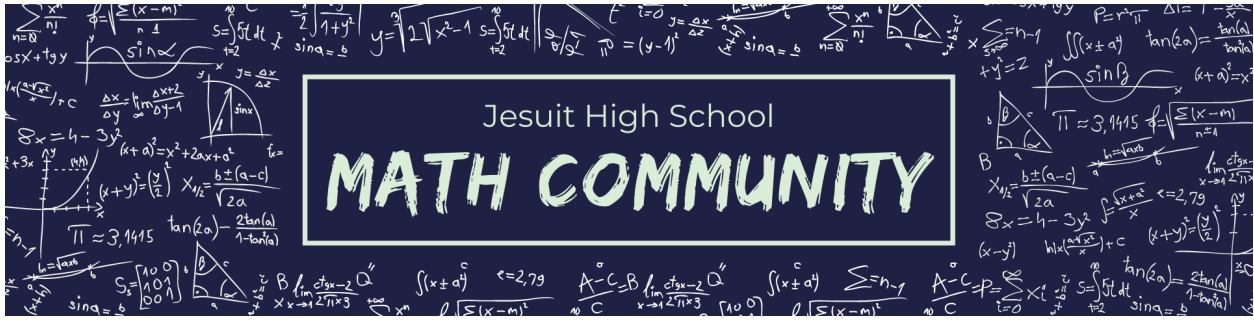
$$\frac{5y}{6x^2} - \frac{4}{3xy}$$

### Challenge 2

Expand the product  $(x + 1)(y + 1)$ .

### Challenge 3

Express  $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$  as a single fraction.



## #135 Geometry Part One: Logic, Lines, and Congruence

9/16-11/18 (10 Saturdays)

Zoom, 9:30-11 AM

\$235 (\$210 through 9/8)

Students will learn about Euclidean geometry. This is the first part of a three-part series that covers all topics included in Jesuit's Summer Session *Geometry* course and Jesuit's Geometry Challenge Exam for incoming freshmen. Topics include **essentials of geometry, reasoning and proof, parallel and perpendicular lines, and congruent triangles**. Students who continue with the series will study relationships within triangles, similarity, right triangles, and trigonometry in the Winter Session and quadrilaterals, properties of circles, length, and area in the Spring Session. Students should expect one hour of homework per class.

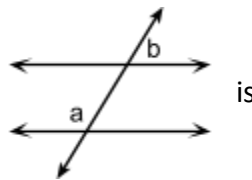
**Prerequisites:** This course is recommended for students who are currently studying algebra in school. Students should be comfortable manipulating variables in order to solve linear equations and inequalities, able to graph linear equations, and familiar with simple radical expressions. The problems below are examples of discussion topics. They are not prerequisites.

### Challenge 1

Find a counterexample to disprove the conjecture: *If the quotient of two numbers is positive, then the two numbers must both be positive.*

### Challenge 2

If the two horizontal lines are parallel, and the measure of angle  $a$  is 100 degrees, what is the measure of angle  $b$ ?

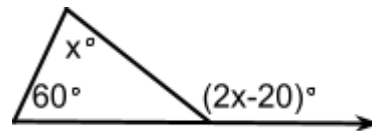


### Challenge 3

Find the distance between the parallel lines  $y = 2x + 3$  and  $y = 2x + 8$ .

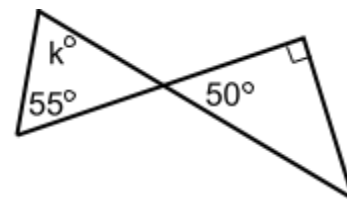
### Challenge 4

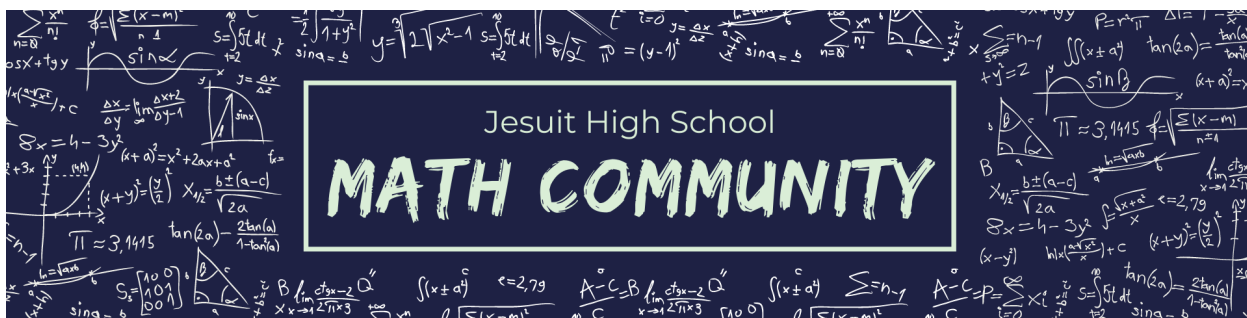
Find the value of  $x$ .



### Challenge 5

Find the value of  $k$ .





## #141 Problem-Solving with Algebra 2: Functions

9/16-11/18 (10 Saturdays) Zoom, 11:15 AM - 12:45 PM

\$235 (\$210 through 9/8)

**Description:** A thorough understanding of functions is necessary for success in Algebra 2 and Precalculus. Students will discuss and build skills involving **combining functions, composition of functions, inverse functions, problem-solving with functions, and operations with functions.** In the later part of the course, students will **graph functions** and learn about **transformations.** These skills create a foundation to build on as students later learn about polynomial functions, exponential and logarithmic functions, and trigonometric functions on their path toward calculus. Students should expect 45 minutes of homework per class.

**Prerequisite:** This class is for students with solid Algebra 1 skills who can successfully complete most of the problems on the first page of this [placement quiz](#). The problems below are examples of discussion topics. They are not prerequisites.

### Challenge 1

Let  $f(x) = 2x - 3$  and  $g(f(x)) = 5 - 4x$ . Find  $g(4)$ .

### Challenge 2

For what values of  $a$  is the function  $f(x) = \frac{x}{x-a}$  its own inverse?

### Challenge 3

If  $f(x - 3) = 9x^2 + 2$ , what is  $f(5)$ ?

### Challenge 4

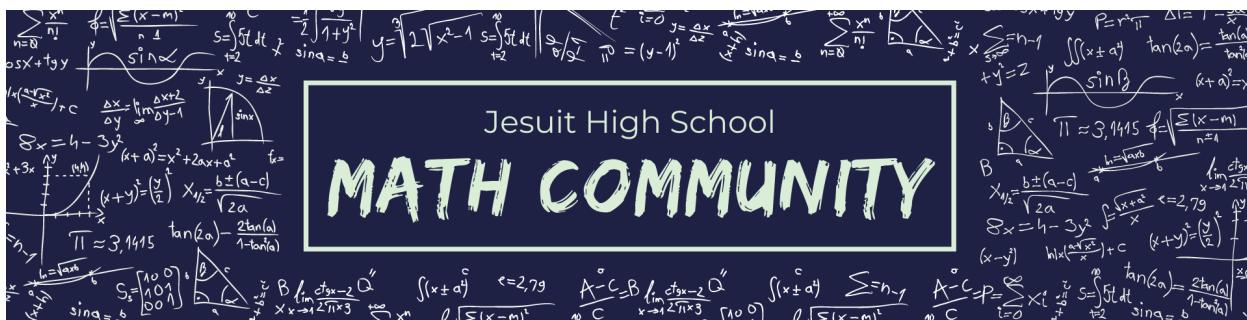
For real numbers  $x$  and  $y$ , define  $x \clubsuit y = (x + y)(x - y)$ . What is  $3 \clubsuit (4 \clubsuit 5)$ ?

### Challenge 5

Is  $\star$  commutative if  $x \star y = \sqrt{x^2 + y^2}$ ?

### Challenge 6

How can we use our knowledge of the graph  $y = x^2$  to quickly graph  $y = (x - 3)^2 + 4$ ?



## Jesuit High School Math Community FAQ

### Will I receive credit for Jesuit's Math Community courses?

Math Community courses that do not take place in the summer are not for credit.

### What if I have to miss a couple classes?

Ideally, students participate in the class conversation; however, we try to record lectures for students who need to miss a class.

### How will I access my course?

Students access courses through Canvas, the classroom management software system that Jesuit uses. Students will receive an email with instructions for logging into their course through Canvas. The course's Canvas page will include a Zoom link for the course's class meetings.

### What materials will I need?

Course materials will be accessed online through Canvas.

### What if I have a question to ask about my class?

Before the class begins, you will receive an email address to contact your instructor.

### If I will be attending Jesuit High School in the fall, will I still need to take a challenge exam if I complete a course with Jesuit's Math Community?

Yes. The three-part geometry series covers the material that is included in Jesuit's Geometry Challenge Exam; however, the class does not include the in-person evaluations Jesuit uses in courses for advancement. These classes are excellent opportunities to prepare for the on-campus challenge exams.

### Will Jesuit's Math Community courses affect my GPA?

No. Some Math Community courses provide grades in order to give students feedback on their performance; however, the grades will not be included on a Jesuit transcript.

### Does enrollment in Jesuit's Math Community affect admissions into Jesuit High School?

No. Jesuit's Math Community is not connected to Jesuit High School's admissions process.

<https://www.jesuitportland.org/academics/math-community>