

Bard Math CAMP 2024 Application

A Note for Parents

We welcome all interested students, encourage those who feel shy to join, and offer scholarships to make attendance possible for students at all economic levels. We value the diversity of our student body, especially with groups traditionally underrepresented in the mathematical sciences.

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February 29, 2024

Dear Parent,

Thanks for helping your child apply to our Creative and Analytical Math Program. We've received the CAMP Interest Form. This packet is the formal application. Applications received by April 30th will receive full consideration. We expect to review all applications and inform you by May 15th whether your child is being invited.

Please print out this packet for your child and have them complete it by hand. They may use additional pages, of course. When they are done, please scan¹ and put together their work into a single, neatly organized PDF document. Email it to us at <hello@bardmathcircle.org>.

Please do not help your child solve the problems!

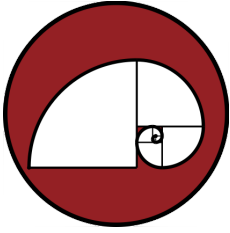
But do make sure that they understand the instructions, including that we accept many students who do not answer all the questions. Then leave the questions for your child to puzzle over. Taking a few days to ponder the problems is fine. What is more important in determining suitability for the program is whether your child enjoys trying challenges or if they find them stressful or otherwise unpleasant.

If appropriate, you may include a note about how your child engaged with this packet, and how you interacted with them throughout the process.

Sincerely,

BARD MATH CIRCLE

¹We recommend that you use a scanning app such as TinyScanner. Such apps produce very readable PDF scans.



Bard Math CAMP 2024 Application

A Note for Students

February 29, 2024

Dear Student,

Thank you for submitting the CAMP Interest Form. Now it's time for the Math Activity Packet, which is the formal application. Please print this out and complete it by hand. You may use additional pages, of course. When you are done, please scan and return it as a single, organized, PDF document.

Please solve the problems on your own! Use scratch paper and show us your thinking!

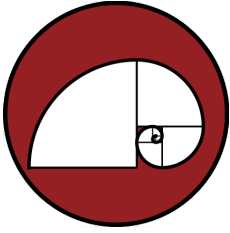
You may ask your adult for help in clarifying the instructions. It is important to know that we accept many students who do not answer all the questions. You may use a calculator on these activities, or write a computer program if you know how. (Most CAMP students have no programming experience; that's okay.) Take your time to puzzle over these problems. Taking a few days to ponder is fine.

If you enjoy working on these problems, especially the parts that you can't answer in less than five minutes, then you will probably enjoy attending CAMP this summer. If you don't enjoy this application, then you might find CAMP to be stressful or otherwise unpleasant.

Please consider asking your adult to write a note about how they were part of the application process for CAMP.

Sincerely,

BARD MATH CIRCLE



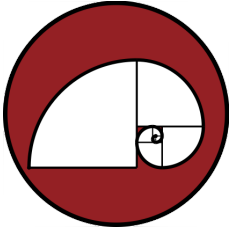
Bard Math CAMP 2024 Application

Student Paragraph

Name:

Please tell us why you want to attend the Bard Math CAMP.

(Write 2–3 sentences, or more if you like. You may describe what math you have especially enjoyed figuring out, or any information we should take into consideration.)



Bard Math CAMP 2024 Application

Math Questions

Instructions: Solve the following problems, writing your answers clearly. We're very interested in *how* you solved them, so please write out your steps. Feel free to be creative, except don't search the internet. You may use a calculator and/or write a computer program. If you do, please let us know. Feel free to use additional pages to write out your answers.

1. The numbers 3 and 5 are 2 apart on the number line and add to 8. What two numbers are 2 apart on the number line that add to 5?

2. How many pairs of whole numbers, a and b , make the following equation a true statement?

$$a + b = \frac{2024}{a} + \frac{2024}{b}$$

For example, if you try $a = 3$ & $b = 4$, this would become

$$3 + 4 = \frac{2024}{3} + \frac{2024}{4} = 674\frac{2}{3} + 506$$

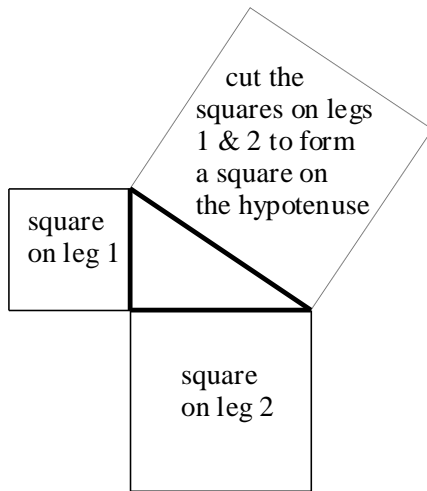
which is definitely NOT TRUE!

List the pairs you find:

a	b

3. A bicyclist going downhill traveled 16 meters during the first second. For the next 3 seconds, the distance covered was $\frac{1}{4}$ more than the distance during the previous second. They kept a constant speed for the rest of the ride. The total ride lasted 8 seconds. What distance did the bicyclist travel?

4. A **right triangle** is a triangle in which one of the angles is a **right** (90°) angle. The sides of the triangle that form the right angle are called **legs** and the side opposite the right angle is called the **hypotenuse**.



One way to state the Pythagorean Theorem is that if you have a right triangle and build two squares whose side lengths match the lengths of the two legs, then they may be cut up and the pieces reassembled to form a square whose side length is exactly the length of the hypotenuse.

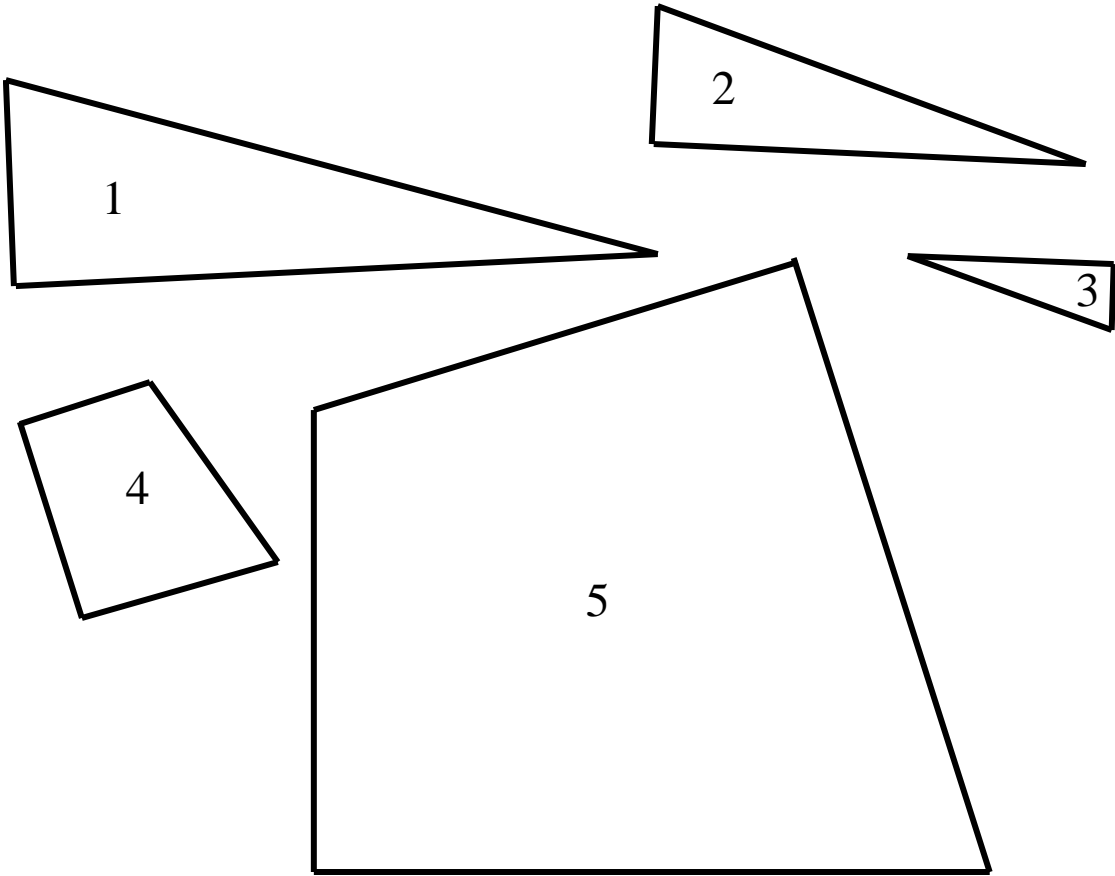
Diagrams that show how to cut and reassemble the leg-squares are called “dissection proofs”. There are many ways to create them.

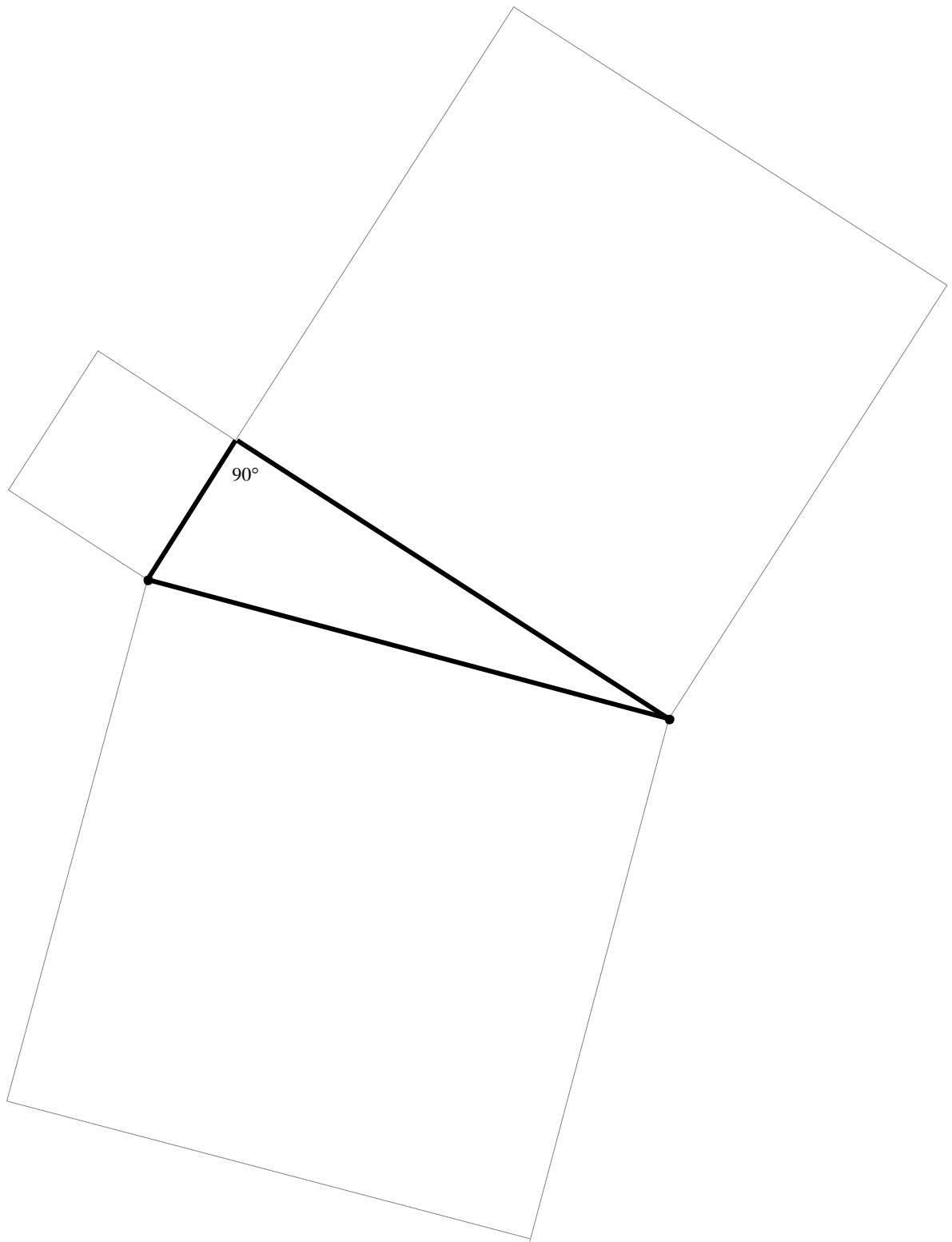
- (a) Cut out the five shapes on the next page. (It’s okay to have someone help you do the cutting).

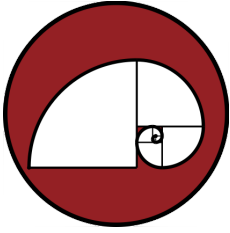
On the page after that, there is a right triangle with squares drawn on its legs and hypotenuse.

- (b) Use the five shapes to build the large square that is on the hypotenuse of the right triangle. Trace and label the pieces with their numbers to show how you formed the large square.

- (c) Then use the same five pieces to build the squares on the legs. Trace and label them too.







Bard Math CAMP 2024 Application

Computer Science and Programming Experience

One of the great things about CAMP is the opportunity to write computer programs to further explore mathematics. We understand that you may not have any previous programming experience, or you might be quite accomplished! Describe your Computer Science (CS) and Programming knowledge and background in the following questions. If you don't have any relevant experience, no worries! Just write "N/A" and leave the rest blank. Or take a risk and fill in your best guesses. Please complete this section without checking reference material, just use what you know in your head.

1. What programming languages have you worked with?

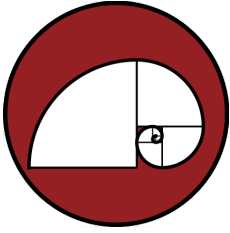
2. Describe your favorite programming achievement.

3. Variables. Feel free to respond N/A to the following questions if you are not sure, or if they do not apply:

- What is a variable in CS?

 - How do you declare a variable in your favorite programming language?
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4. Write a short function to print out "Bard CAMP 2024" in your favorite programming language.



Bard Math CAMP 2024 Application Checklist

Applications received by April 30th will receive full consideration.

When you have completed this packet,

- Please organize your pages and scan them as one PDF document. If you don't have a flatbed scanner, we recommend a smartphone app like **Tiny Scanner**, for both Android and iPhone. The results are quite good.
- Email the PDF to `<hello@bardmathcircle.org>`.
Use the subject line:
"2024 CAMP Math Activity Packet:<Student Name>"
- If things are going slowly and you won't have this completed by April 30th, please send a friendly email to `<hello@bardmathcircle.org>`.