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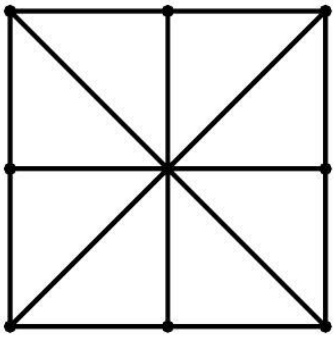
Join us and share your thoughts in the Facebook group "AIMC Summer Camp 2020," sign up for notifications on the Remind app using the class code 9kffac, and visit our website aimathcircles.org.

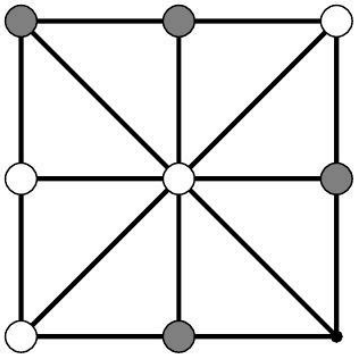
Riddle: *It belongs to you, but other people use it more than you do.*

Share your answer with us online. We'll share the answer online and in Issue #2!

Family Fun: Achi!

Achi is a game played by the Ashanti people of Ghana in West Africa. This two-player game is played on a three-by-three diagram of horizontal and vertical lines and two diagonals. Achi is like tic-tac-toe, but with a twist. Each player has just four pieces, which they take turns placing on the board's nine places where two or more lines intersect. The object is to get three in a row along one of the straight lines, as the person playing the white pieces has done in the second figure. There are two stages to the game:



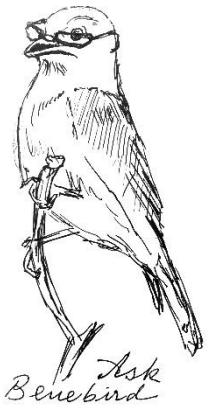


1. Starting with an empty board, players take turns placing their pieces.
2. If no one has won after each player has played their four pieces, players take turns moving one piece along a line into an empty position. No jumping is allowed.

You can draw the game board on a piece of paper, and use anything, such as coins or beans, for game pieces. Take some time to play the game with a partner. Then think about some of these questions and share what you find!

1. After both players have played all their pieces, how many empty positions are there?
2. Suppose that the center position is empty in stage two of the game, and that it's the turn of the person playing the white pieces. Can you guarantee that white can win in their next move?
3. Suppose that black can't move in stage two of the game and that the lower left corner is empty. What does the game board look like?
4. Suppose that black can't move in stage two of the game and that the lower center position is empty. What does the game board look like?
5. Suppose we add a rule that a player loses their turn if they can't make a play and suppose that black cannot make a play. Can you guarantee that white can win in their next move?
6. If both players play smartly (for instance, don't pass up any obvious opportunities to win), can you guarantee that no player will get stuck?
7. How is the game different if each player only has three pieces?
8. Can you create an interesting variation with a different configuration of lines?

Adapted from Francis Su's *Mathematics for Human Flourishing*



Ask Bluebird

Send us any math-related question and Bluebird will find an answer! Below is a **Q**(uestion) and **A**(nswer) from the past.

Q: Why does the circle have 360 degrees?

A: Nobody knows for sure. This choice of the number of degrees is somewhat random. But here are some ideas which might explain this particular choice:

First, 360 is a multiple of 60, and many ancient peoples used the base 60 (sexagesimal) number system. The sexagesimal system was originally used by the Sumerians around 2000 BC and later by the Babylonians. What makes the number 60 handy is the fact that it has many factors that divide evenly into it. For instance, the number 60 has twelve factors, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60, of which 2, 3, and 5 are prime.

In times when decimals didn't yet exist, it was nice to have evenly divisible sections of time. For example, because an hour has 60 minutes, you can have the hour, half-hour, quarter-hour, one-third-hour, one-fifth-hour, one-sixth-hour, one-tenth hour, one-twleve, one-fifteen, one-twenthieth, one-thirtieth, and one-sixtieth of an hour all dividing evenly into a whole number of minutes.

And second, 360 is very close to 365, the total of days in a year – the full cycle of the Sun around the Earth.

How am I different?

Think about each of the four numbers in the grid on the left below: 9, 16, 25, and 43. For each number, find one thing that makes that number different from the other three. For instance, the number 9 has one digit, while all the others have two. How about the number 16? Can you find a property that distinguishes that number from the others? How about 25? 43?

9	16
25	43

17	26
44	65

Now what about the four numbers on the right: 17, 26, 44, 65?
Share your findings with us!

Fun Facts of the Fortnight

- Number of seconds since the Big Bang: about 435,196,800,000,000,000
- Number of planets in the universe: about 200,000,000,000,000,000,000,000
- Number of ways you can arrange a 52 card deck: 80,658,175,170,943,878,571,660,636,856,403,766,975,289,505,440,883,277,824,000,000,000,000 (Or, more succinctly, 52! = 52 x 51 x 50 x …x 3 x 2 x 1).