BLUEBIRD MATH CIRCLE
Alliance of Indigenous Math Circles

Issue 3

Share your problems, solutions, models, stories, and art at:
https://aimathcircles.org/Bluebird

NEWSFLASH

Join LIVE Bluebird Math Circle to work on these activities together with friends and family.

Monday April 26, 5-6 PM MDT online.
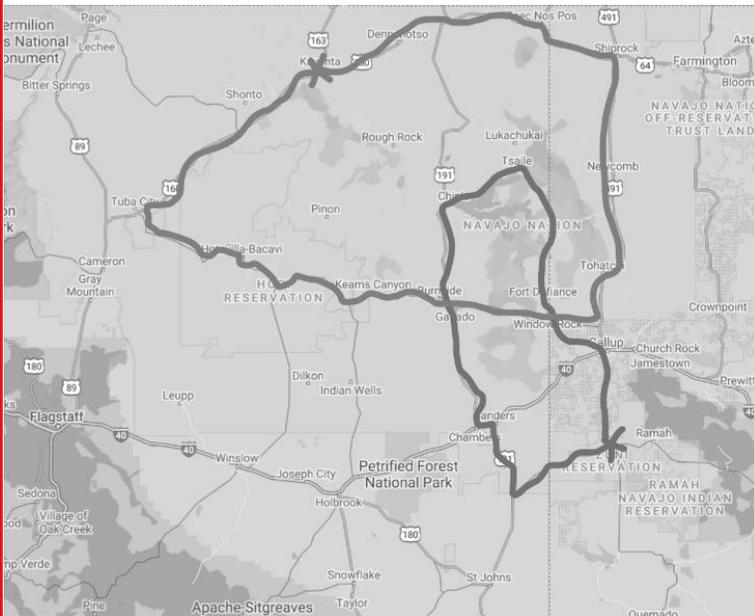
Sign up at **https://aimathcircles.org/Bluebird**

MATH MEME

HOW A GRAPH THEORIST DRAWS A "STAR":

spikedmath.com © 2012

GOOD JOB MIKE!
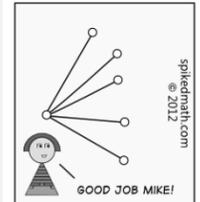
Family Circle: Road Inspector

PROJECT — HELP INSPECT THE ROADS ON THE RESERVATION.

ACTIVITY 1: Each month, a road inspector drives around the big red circle shown on the map to make sure the road is safe. He lives in Kayenta, so he departs and returns from there.

Another inspector lives in Zuni. Each month she inspects the blue circle of roads shown below. Both road inspectors travel each road once, making a circuit without retracing their path.

But one month, the 'blue' inspector is ill and cannot do her job. The 'red' inspector must inspect both routes. He must be efficient, so wants to cover both routes, but doesn't want to travel the same road (or part of a road) more than once.

Can you help him plan his route?

Note: If you have been to Ganado or Window Rock, you may know that the blue path overlaps the red path for a small stretch of road. For this problem, ignore that fact. It can't be helped.

In particular:
   a) Can he start from Kayenta, come back to Kayenta, and inspect all the roads (both the red and the blue below)? Remember that he must travel every road once, and must not travel any road more than once.
   b) Can he start from Window Rock, come back to Window Rock, and inspect all the roads?
   c) Can he start at any point on the red path or the blue path, inspect all the roads, then come back to the same spot? That is: is there any place on either road where he cannot start from and end up at?

ACTIVITY 2: Here is another path that a road inspector might have to travel.

Can you find a way for him to trace the path without going over any section of road twice?

Can he do it, starting and ending at the same place? If so, where should he start?

How is this map the same as the first map? How is it different?

ACTIVITY 3: How about this map?

a) Can he trace it, going over each road exactly once?
b) Can he do it if he must come back to where he started? What if he does not need to come back to where he started?
c) Whether or not he returns to the same place, can he start anywhere and trace the roads without going over any more than once?
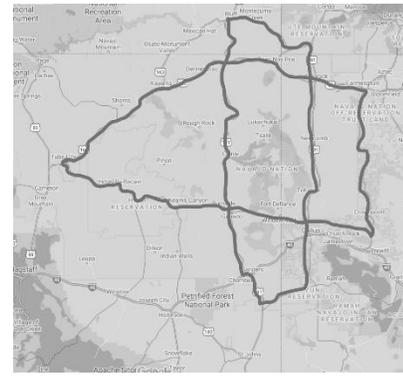
Look at these maps and see what questions are interesting. What do you notice about where to start and end a path that traces each road exactly once?
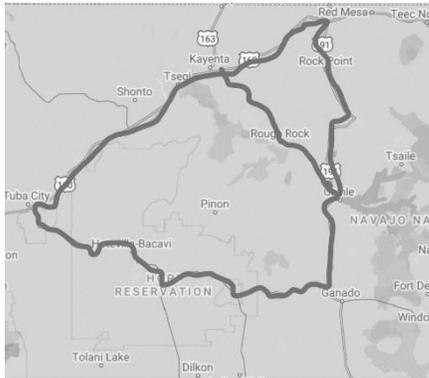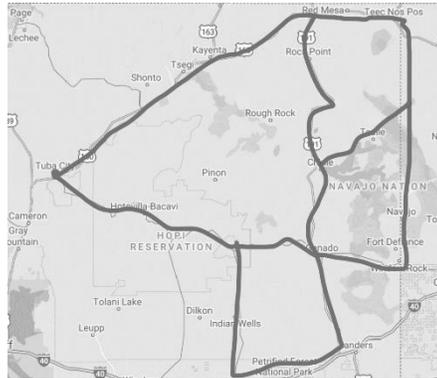
| Map 4 | Map 5 | Map 6 |

MAKE YOUR OWN MAP: Can you make one that cannot be traced in a single trip? How do you know?
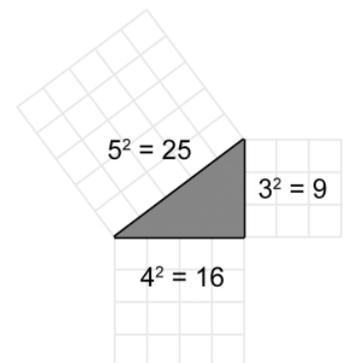
Ask Bluebird

QUESTION—*What is the Pythagorean theory?* From Ye-Shiao T.

BLUEBIRD SAYS—Religion, philosophy, and science are three ways to understand our world. The Pythagoreans lived in a time when there were no clear distinctions among these approaches. Their view was that if we can understand numbers, that will lead us to an understanding of the world. So they used numbers to describe elements, the emotions, the human body, and many other aspects of life.

Two of the most lasting contributions of the Pythagoreans were in music and mathematics. In music, they discovered that harmonies could be described by number—by the lengths of strings that produced certain notes. In mathematics, they discovered the famous Pythagorean Theorem, which relates distances measured in directions at right angles to distances measured diagonally.

Arithmetic and geometry, for the Pythagoreans, were the same realm. "At first sight, arithmetic and geometry seem to be completely unrelated realms. Arithmetic is based on counting, the epitome of a *discrete* (or *digital*) process. (...) Geometry, on the other hand, involves *continuous* rather than discrete objects, such as lines, curves, and surfaces. Pythagoras' theorem (...) has continued to hold a key position between these two realms throughout the history of mathematics." - John Stillwell

$5^2 = 25$
$3^2 = 9$
$4^2 = 16$

Let Bluebird know if any of his comments interest you further!

| **FUN FACT OF THE FORTNIGHT** | In any group of people, at least two people have the same number of friends within the group.

Check for yourself. You can check real groups, or groups from books and movies, or people you make up. Can you explain *why* that happens? |