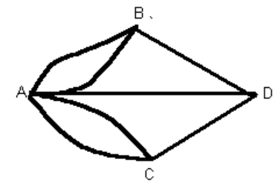
Traveling Networks



The Konigsberg Bridge problem is a famous mathematical problem studied by many students in geometry. As you found out through the class discussion it is not possible to travel over all seven bridges between the two islands and the two sides of the river banks. The Konigsberg Bridge problem can be reduced to the following diagram of points and lines where the points represent the four pieces of land the lines represent the seven bridges between the four pieces of land.

In the textbook, Discovering Geometry, the author defines an odd point and an even point. Notice that in the Konigsberg Bridge problem all the points are odd points.

1. You are to practice traveling 16 patterns keeping track of whether or not the pattern can be traveled. Remember you may want to try different starting points to see if the network can be traveled. First try one vertex - see if you can travel the network starting at that vertex. If you can you can label the network as a "yes". If you can't then try starting at another vertex. Keep trying to travel the network from each vertex until you are successful. You should only label a network as "no" when you have tried starting at each vertex.
2. Don't say NO too quickly.
3. Remember your data must be accurate if you are going to make a conclusion about what makes it possible to travel the network.
4. After you have tried each network you should have found 9 networks that could be traveled and 7 that could not be traveled. Record the number of odd and even points in each network. These are a key to deciding whether a network can be traveled. If this is not true check some of your networks again until you have the right number of networks that can be traveled.
5. Answer these questions:

- Of the networks that could be traveled, how many of the networks had an odd number of odd points? • _____________
- Of the networks that could be traveled, how many of the networks had an even number of odd points?_____________ • _____________
- Of the networks that could be traveled, how many of the networks had an odd number of even points? • _____________
- Of the networks that could be traveled, how many of the networks had an even number of even points?_________________ • _____________
- Shade in the columns on the chart for all networks that can be traveled. • _____________
- Look to see how many odd points a network must have to be traveled. Does it seem to matter how many even points a network contains? • _____________
- What do you notice about the number of odd points on a network that can be traveled? (How many odd points must it have?) • _____________
- Write a conjecture that describes what must be true about the number of odd points in a network if it can be traveled?

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Network	Example	A	B	C	D	E	F	G	H
Number of Odd points	4								
Number of Even points	0								
Can the network be traveled? Yes or NO	NO								

Network	I	J	K	L	M	N	O	P

Study Konigsberg Bridge diagram (Figure 1). Notice the drawing has 4 odd points. Use your conjecture to add a path so the number of odd points will make it possible to travel. Describe how this addition fits your conjecture.

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Make two new networks up: one that cannot be traveled and one that can be traveled. Use your conjecture to explain why each can or cannot be traveled.

A NETWORK THAT **CAN** BE TRAVELED	A NETWORK THAT **CANNOT** BE TRAVELED
Why:	