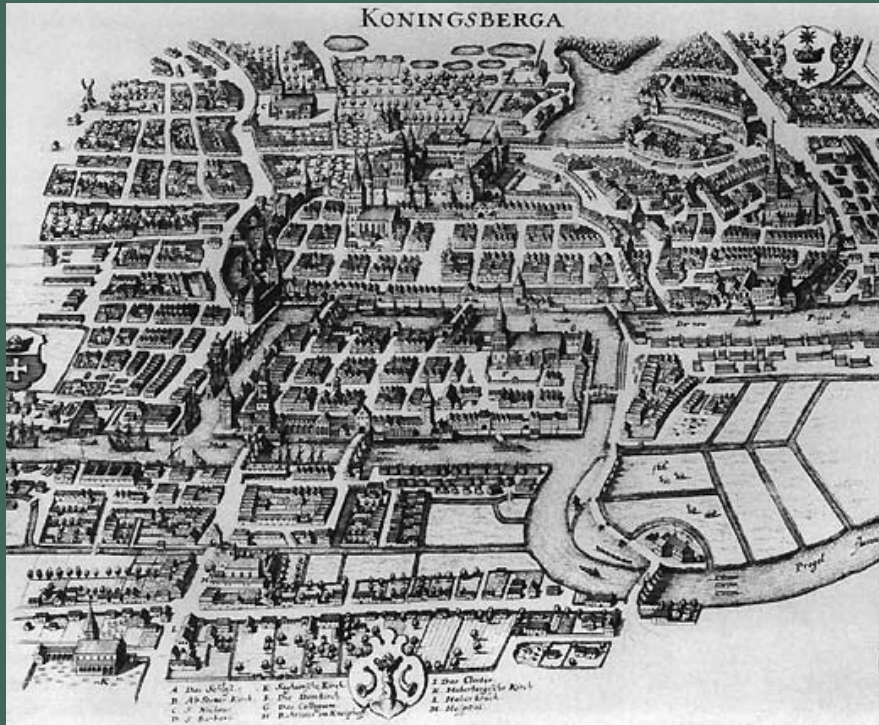


STEM Sims™

Bridge Out

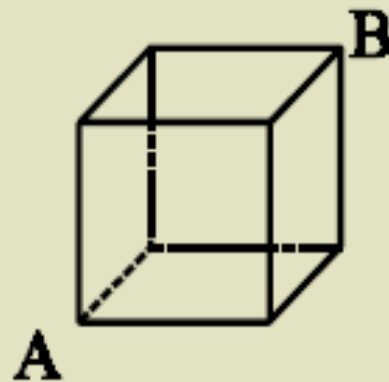


Bridge Out

**Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.**

Start learning right now about discrete mathematics and how it is used in everyday life. Take the following brief quiz to see how much you already know about this interesting branch of mathematics. See the bottom of page 4 to check your answers.

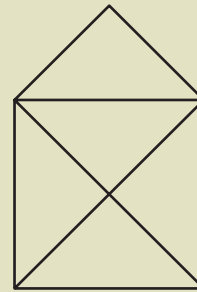
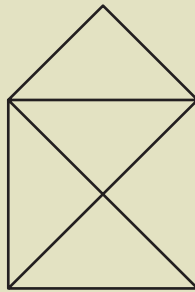
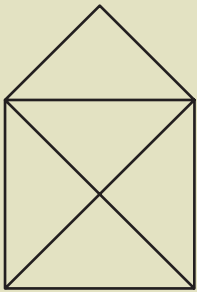
- Which of the following would be an expected area of study in the branch of discrete mathematics?
 - calculus
 - analysis
 - countable sets
 - continuous data
- A good synonym for the term “discrete” would be:
 - connected.
 - prudent.
 - joined.
 - unattached.
- In 1852, the idea that adjoining states on a map could be distinctly colored using only four colors was first proposed. In what year was a proof provided to support this proposition?
 - 1852
 - 1855
 - 1906
 - 1976
- Discrete mathematics has many applications in the area of computer science.
 - true
 - false
- How many different paths using a forward motion only (no backtracking) are there from point A to point B in the figure?
 - 4
 - 6
 - 8
 - more than 10



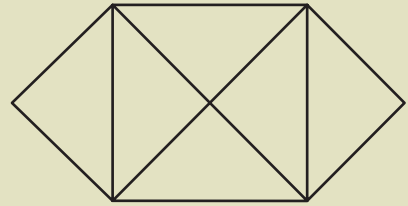
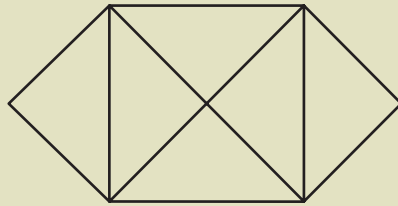
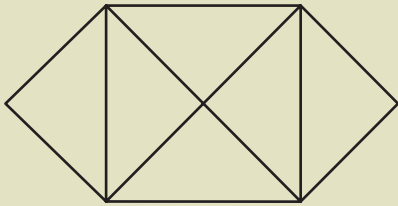
Just a Trace

Which of the following figures can be drawn with one continuous forward movement from your pencil? Your pencil cannot be lifted off the page, nor can your pencil path be retraced over an existing line. See the bottom of page 4 to check your answers.

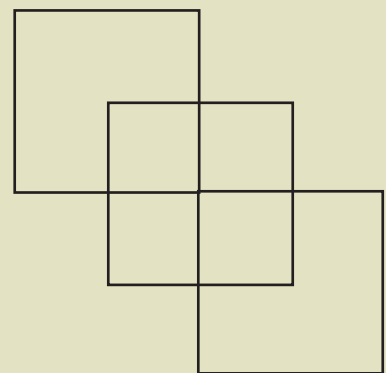
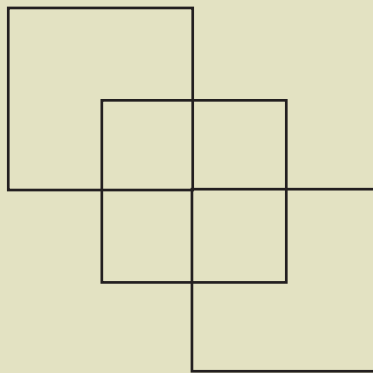
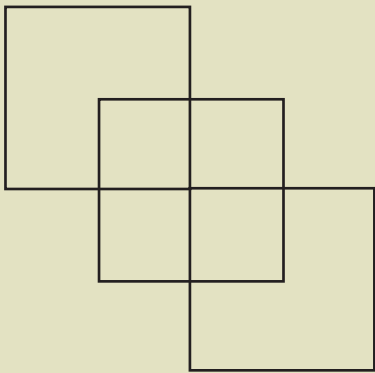
1.



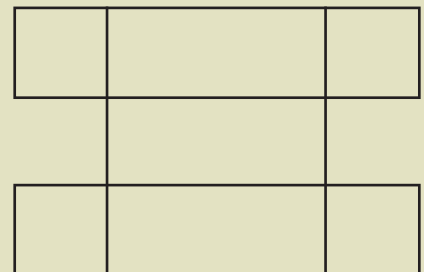
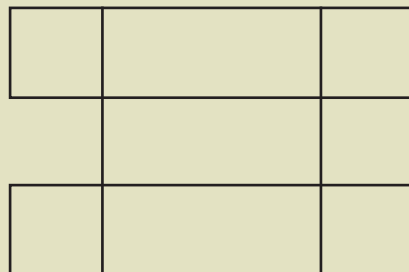
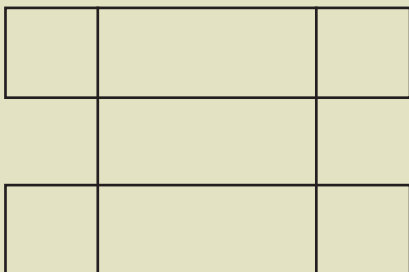
2.



3.



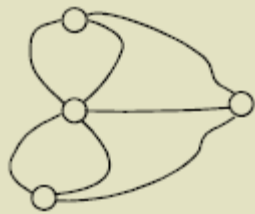
4.



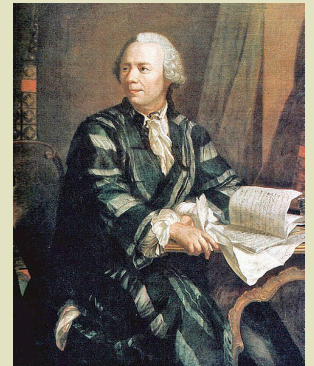
Bridge Out

Seven Bridges for Seven Sisters?

During the 18th century, the city of Königsberg, which is now called Kaliningrad had seven bridges that connected different parts of the city. The locals would walk around the city and cross the bridges each Sunday as part of a mini-celebration. Those in charge wondered if a route could be created that would allow the walkers to travel in one direction and cross each bridge only once. A sketch of the bridges and land appears below. The bridges are represented by the lines, the circles indicate land masses.



A mathematician named Leonard Euler tried to answer the local's question. He applied a discrete mathematics idea and discovered that it was impossible to complete their walk in one direction crossing each bridge only once. His answer led to the creation of Euler's Theorem, which was the first theorem in graph theory (a branch of discrete mathematics). You just never know when the application of mathematics will be useful in solving life's daily problems.



$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \lim_{n \rightarrow \infty} \left(\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \cdots + \frac{1}{n^2} \right) = \frac{\pi^2}{6}.$$

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STEMsims.com

Answers: Page 2 Answers: 1) c, 2) d, 3) d, 4) a, 5) d. Page 3 Just a Trace Answers: 1) yes, 2) yes, 3) no, 4) yes.

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