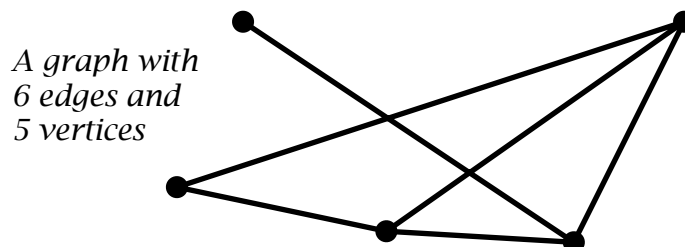




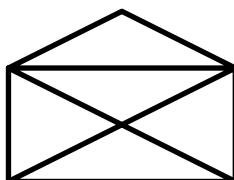
Circuits and Tours

A **graph** is a collection of vertices (points) connected by edges (lines).



One of the earliest graph problems to be solved was the **Königsberg Bridge Problem**, introducing the idea of an **Eulerian circuit**.

Explain the Königsberg Bridge Problem and give the solution.



How are Eulerian circuits connected to the problem of drawing a picture without taking your pencil from the paper?

The name **Hamiltonian circuit** arises because Sir William Hamilton investigated such circuits on the dodecahedron.

Explain the dodecahedron problem and give the solution.

Which other platonic solids have a Hamiltonian circuit?

A **knight's tour** of a chessboard (or any other grid) is a sequence of moves by a knight chess piece (which may only make moves which simultaneously shift one square along one axis and two along the other) such that each square of the board is visited exactly once.

If the final position is a knight's move away from the first position, the tour is a Hamiltonian circuit.

The first thorough study of knight's tours was presented by Leonhard Euler in 1759.

What is known about knight's tours for different sizes of boards?