NAME

Module 20 Solving Problems Using Probability, Statistics, and Discrete Math

Lesson 4 Solving Discrete Mathematics Problems

guided notes

Lesson Objectives

- Determine if a graph is traversable.
- Find a traversable path.
- Determine if two graphs are equivalent.

A graph is a collection of vertices and edges. Each point is a vertex, and each segment or arc connecting the vertices is called an edge. An edge can be straight or curved.

The degree of a vertex is found by counting the number of edges connected to it.

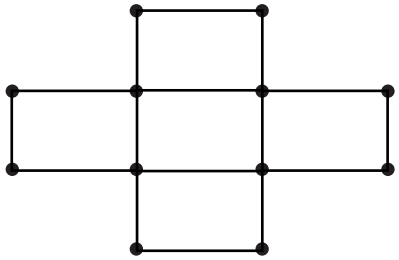
A graph is traversable if it has a path in which each edge can be traced exactly once. The traversable path is the shortest way to go to each of the vertices of the graph.

A graph is traversable if, and only if, either of the following is true. Each vertex has an even degree, or exactly two vertices have an odd degree.

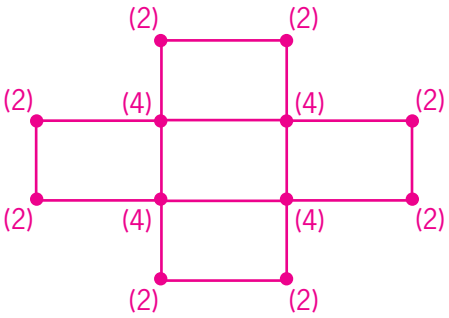
When there are exactly two vertices with odd degree, those vertices are always the starting and ending points of the traversable path.

When the degree of every vertex is even, any point can be a starting or ending point of a traversable path.

Use the following graph for Questions 1 and 2. The graph shown represents a neighborhood. The edges represent the streets, and the vertices represent the intersections.



1 Find the degree of each vertex.

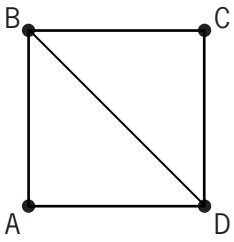


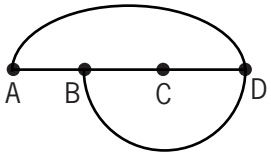
2 A student in the neighborhood is selling cookies from door to door. Is there a traversable path that would enable her to walk around the entire neighborhood without walking any part of a street more than once?

Yes, the paths are traversable.

In equivalent graphs, the edges form the **same connections** of vertices.

3 Determine if the graphs are equivalent graphs.





Yes, the graphs are equivalent.