

Abstract

The aim of the research is to introduce the basic idea of graph theory, some important definitions about graph theory and related it, and study important properties and related concepts.

Also, present what we consider to be the basic material, together with a wide variety of applications, both to other branches of mathematics and to real-world problems. Included are simple proofs of theorems of Brooks, Chvatal, Tutte and Vizing. The applications have been carefully selected, and are treated in some depth. We have chosen to omit all so-called 'applications' that employ just the language of graphs and no theory.

The applications appearing here are for theory given in the first chapter. We have also stressed the importance of efficient methods of solving problems. Several good algorithms are included and their efficiencies are analyzed. We do not, however, go into the computer implementation of these algorithms.