

Lesson 5: Bipartite graphs and geometry

Konstantin Miagkov

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Problem 1.

Is it possible to walk around the 7×7 chess board with a knight visiting every square exactly once and finishing back at the starting square?

Problem 2.

a) A bipartite graph has b white and r black vertices. What is the maximum possible number of edges in this graph?

b) What is the maximum possible number of edges in a bipartite graph with $2n$ vertices?

c) What about $2n + 1$ vertices?

Problem 3.

Show that if a graph has no cycles, then it is bipartite.

Problem 4.

Let $ABCD$ be a cyclic quadrilateral with $AD = CD$. Let T be the intersection of lines AD and BC . Given that $AB = CT$, show that $\angle DBT = \angle DTB$.

Problem 5.

Kiselev 276, p. 108

Problem 6.

Kiselev 277, p. 108