Minimum order of graphs with given coloring parameters

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Abstract

A triple $f, g, h$ is realizable if there exists a connected graph with chromatic number $f$, Grundy number $g$, and achromatic number $h$. In [1], the set of all realizable triples has been determined.

Here we solve the following two problems: 1. For all realizable triples $f, g, h$ of integers, what is the minimum number of vertices of the graph above? 2. Which are the extremal graphs for $f = g = 3$, $h \geq 9$?

References