

Math589 Homework 2

Note: To submit the k-th homework, simply put your files in the folder HWk on CoCalc, and it will be collected on the due day.

1. Suppose G is a simple graph on n vertices and m edges. Show that if $m \leq n - 2$ then G is not connected.

Solution. Start from n isolated vertices. (That is, a graph on n vertices without any edge.) When an edge is added, it at most combines two components into one component. This operation decreases the number of components by at most one. If $m \leq n - 2$ edges were added, then the number of components is at least $n - m \geq 2$, so G is not connected.

2. Find two distinct graphs on 4 vertices with 3 edges.

Solution. Each of the following two graphs has 4 vertices and 3 edges.

