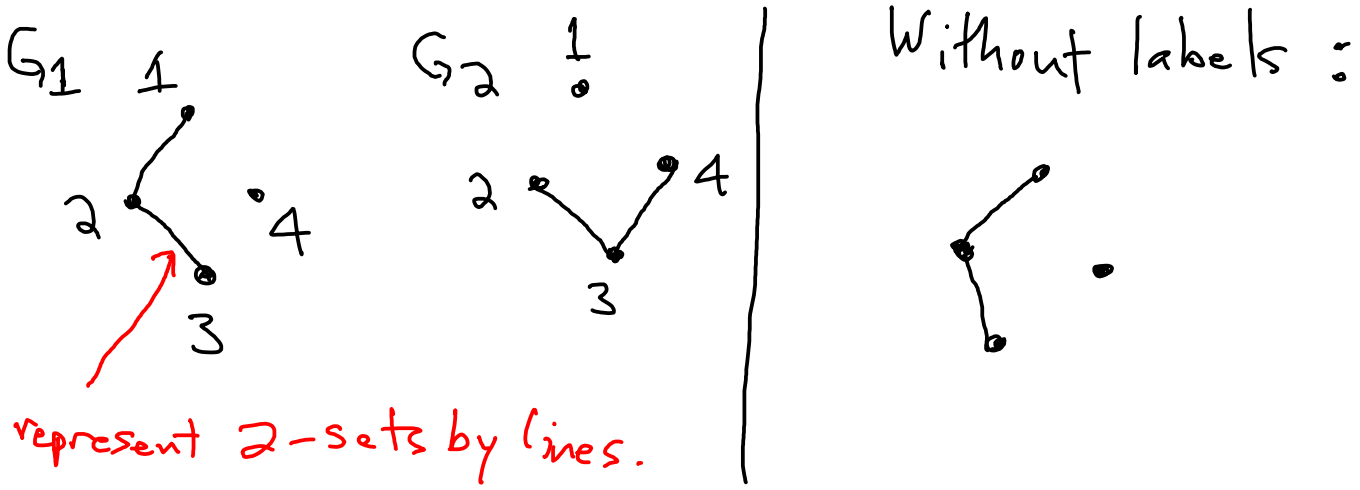
MA 614 – Homework 1
Due Fri, Jan 14th

Your answers should be detailed explanations in quality mathematical English. You must type your homework in LaTeX.

1. Let V be a finite set. A *graph* $G = (V, E)$ is a collection E of 2-element subsets of V. The elements of V are called *vertices of* G and the subsets in E are called *edges of* G. How many different graphs are there with vertex set $V = [4] := \{1, 2, 3, 4\}$ if we consider the elements of V to be distinct? What if the elements of V are indistinct, i.e. they are interchangeable? (For example, in the first case we count as different the graphs G_1 and G_2 with $E_1 = \{\{1, 2\}, \{2, 3\}\}$ and $E_2 = \{\{2, 3\}, \{3, 4\}\}$, while in the second case we count them as the same graph since they are the same up to permuting the names of the vertices.) See the pictures below for a useful way to represent graphs graphically.



2. Six people split up into three groups of two each. In how many ways can this be done?

3. Read the syllabus carefully. (There is nothing to turn in for this problem, just make sure to read it carefully.)