

## MATH 184A: PROBLEM SET 4

DUE AT 16:00 ON FRIDAY, FEBRUARY 9

- (1) Let  $\mathcal{P}$  be a point configuration in  $\mathbb{R}^3$ , and let  $\mathcal{L}$  denote the corresponding line configuration. Show that either  $\mathcal{L}$  consists of a single line, or it contains an ordinary line (Hint: reduce to the two-dimensional case).
- (2) A single line drawn in the plane divides the plane into two regions. Two lines divide the plane into four regions, provided they are not parallel.
  - (a) Determine the maximum number of regions into which three lines can divide the plane.
  - (b) Find a formula for the maximal number of regions into which  $n$  lines can divide the plane, and prove that your formula is correct.