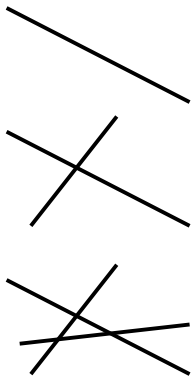
Name_____**ID** _____

Activity 4-2 (30 Aug 2018)

3. (MN-ex-3a) Draw *n* lines in the plane in such a way that no two are parallel and no three intersect in a common point. How many parts do the lines divide the plane into? Experiment, guess the value, and prove it by induction.
(For n=1, the number of parts = 2. For n=2, the number of parts = 4.
For n=3, the number of parts = 7. See examples on the right side of this page.)



4. (LPV1.3.2) Let $A = \{1,2,3,\ldots,n\}$. How many subsets of A that contains n? Explain your reasoning.

5. Prove that the number of subsets of a set with n elements is 2^n by induction.

6. (R-3.3-ex-37) Show that if n is a positive integer then

$$\sum_{\{a_1, a_2, \ldots, a_k\} \subseteq \{1,2,\ldots,n\}} \frac{1}{a_1 a_2 \cdots a_k} = n \quad .$$

In this problem, the sum is over all non-empty subsets of {1,2,...,n}.