

Four of these problems will be graded, with each problem worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor. Submissions must be on clean paper with no ragged edges.

1. For $n \geq 1$ and $1 \leq k \leq n$, $C(n, k) = \frac{n!}{k!(n-k)!}$.

2. The Banana Theorem: Let A be a set with n elements of k different types (such that elements of the same type are regarded as indistinguishable from one another for purposes of orderings). Let n_i be the number of elements of type i for each integer i from 1 to k . Then the number of different

arrangements of the elements in A will be $\frac{n!}{\prod_{i=1}^k (n_i!)}$.

3. Let \sim be a relation on $\mathbb{R} \times \mathbb{R}$ defined by $(a, b) \sim (c, d) \Leftrightarrow |a - c| + |b - d| \in \mathbb{Z}$. Determine whether \sim is reflexive, symmetric, or transitive, and support your conclusions well.

4. Do the *Combinatorics* WeBWorK assignment:

- Your Username should be the same as your Coe network account.
- Your password should start out as your Coe ID# (of course you should change it promptly).
- You should have received an email earlier today reminding you of this assignment.
- A link to WeBWorK can be found on the course web site via <http://www.public.coe.edu/~jwhite/>, or Google for “Jon’s Central”.
- The WeBWorK assignments will generally be due before midnight on the same day as the Problem Set they’re part of.

