

MATH 2001. COUNTING PROBLEMS
(permutations and combinations)

- (1) How many lists of lengths 3 can be made from the symbols A, B, C, D, E, F if ...
- (a) ...repetition is allowed?

 - (b) ...repetition is not allowed?

 - (c) ...repetition is allowed and the list must start with the letter A?

 - (d) ...repetition is not allowed and the list must not start with the letter A?

 - (e) ...repetition is allowed and the list must contain the letter A?

 - (f) ...repetition is not allowed and the list must contain the letter A?

- (2) Consider lists made from the symbols A, B, C, D, E, with repetition allowed.
- (a) How many such length-4 lists have at least one letter repeated?

 - (b) How many such length-4 lists contain exactly two different letters?

 - (c) How many such length-5 lists have at least one letter repeated?

 - (d) How many such length-5 lists contain exactly two different letters?

 - (e) How many such length-6 lists have at least one letter repeated?

 - (f) How many such length-5 lists are there if the letters A, B, C must appear consecutively in the list?

 - (g) How many such length-6 lists are there if the letters A, B, C must appear consecutively in the list?

 - (h) How many such length-5 lists are there if the list must start with a vowel, end with a vowel, and use all the five letters?