

Math 105, Spring 2017
Collected Homework – Combinations and Permutations
Due Monday, April 24

Write all work and answers on a separate sheet of paper.

1. Evaluate each of the following, using the formulas developed in class. Show all work; in particular, for the combinations formula, show the setup and cancellation of factors that leads to your result. Write each answer as a product (e.g. $2 \times 7 \times 3 \times 5$) and also as a decimal (e.g. 210).

$$P(10,3) \quad P(10,7) \quad C(10,3) \quad C(10,7) \quad C(16,2) \quad C(16,14)$$

2. For the following questions, assume we're selecting all notes from the set $\{A, B, C, C\#, D, E, F\#, G\}$. (Note that there are eight notes in this set.)

Try to answer each of the following. Show/explain how you came up with your answers, either by listing all possible ways to complete the given task, or by explaining how to predict how many there must be without listing them all.

(Reminder: a "melody" is an ordered selection of notes; a "chord" is an unordered selection.)

- a. How many ways are there to select a three-note chord?
- b. How many ways are there to select a three-note chord, if one of the notes *must* be D?
- c. How many ways are there to select a three-note chord, if *none* of the notes may be D?
- d. How many ways are there to select a three-note melody, if no repetition of notes is allowed?
- e. How many ways are there to select a three-note melody, if exactly one note must be a D, and no other repetition of notes is allowed?
- f. How many ways are there to select a four-note melody, if exactly two notes must be D's, and no other repetition of notes is allowed?