COT 3100 Recitation #7: Counting (Spring 2017)
3/20-24/2017

Warm-Up Problems

1) Triangle ABC has a right angle at C. If sin A = 2/3, what is tan B?

2) In a certain population the ratio of the number of women to the number of men is 11 to 10. If the average age of the women is 34 and the average age of the men is 32, then what is the average age of the population?

3) If $log_7\big(log_3(log_2 x)\big) = 0$, what is $x^{-0.5}$?

4) What is the units digit of $3^{1001}7^{1002}13^{1003}$?

5) Let x = .123456789101112…998999, where the digits are obtained by writing the integers 1 through 998 in order. What is the 2017^{th} digit to the right of the decimal point?

Counting Problems

6) Bob has the following tasks to complete for the morning: brush teeth, eat breakfast, pay bills, do homework, call his friend Sue. If he must brush his teeth before eating breakfast and there are no other restrictions for the ordering of his tasks, in how many ways can he complete the five tasks?

7) How many strings of 10 letters can be formed such that no substring of 3 letters within the string contain a repeated letter? (For example, ABCABCABCY should be counted since none of the substrings ABC, BCA, CAB, ABC, BCA, CAB, ABC or BCY have any repeated letters, but ABCDEFGHIH should not be counted because the substring HIH contains H twice.)

8) A sorted string is a string which has its letters in alphabetical order. How many sorted strings of 5 letters can be formed from the letters {A, B, C, D, E, F, G, H, I, J}?

9) Each student (and the students are distinguishable) in a class of 10 selects one of 5 pizzas (cheese, pepperoni, mushroom, vegetable, supreme). In how ways can the students order such that at least one student orders a cheese pizza?

10) Each student (and the students are distinguishable) in a class of 10 selects one of 5 pizzas (cheese, pepperoni, mushroom, vegetable, supreme). In how ways can the students order such that at least one student orders a cheese pizza and another orders a pepperoni pizza?