MATH 10B – Spring 2019
Quiz 3 – Prepared by John Yirong Zhen
Date:02/12/2018

You are to finish this quiz in 10 minutes. You are allowed one single-sided letter-size cheat sheet. No calculators or other notes/books/devices are allowed.

Your cheatsheet must be handwritten by you, no photocopying or preprinted (unless you have written permission from the instructor). Try your best! Stay calm and good luck!

I. True/False (2 pts)

Circle T or F in the space provided in front of the statement to indicate whether it is true or false respectively. You get $+1$ for a correct answer, -1 for incorrect, and 0 for leaving it blank. (You should not guess if you don't know the answer.)

You do not need to justify your answers for T/F statements.

- T   F   The equation $x_1 + x_2 + x_3 + x_4 = 10$ in nonnegative numbers where the order of the variables does not matter has as many solutions as the number of ways to split 10-tuplets (10 identical kids) into 4 identical playpens, where each playpen has at least one kid.

- T   F   There are $\binom{18}{4}$ solution for the equation $x_1 + x_2 + x_3 + x_4 = 18$, where x_1, x_2, x_3, x_4 are nonnegative integers.

II. Written problems (10pts)

- You MUST **justify your answer** to undoubtably convince me that you solved and not guessed it. Partial credit will be given to good work and progress even if there is no final answer or the answer is incorrect. On the other hand, bogus justification for a correct answer will receive a 0.

- Keep your scratch work separate. Cross out writing you don't want to be graded and clearly label the parts you want to be graded.

- Points will be deducted for incorrect writings that you "forget to cross out."

(a) How many solutions are there to the inequality

$$x_1 + x_2 + x_3 + x_4 \leq 14$$

where x_1, x_2, x_3 and x_4 are nonnegative integers? [Hint: Introduce an auxiliary variable x_5 such that $x_1 + x_2 + x_3 + x_4 + x_5 = 14$].

(b) How many different strings can be made from the letters in AAACCCCDDB, using all the letters?