

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.

- ① F The equation $x_1 + x_2 + x_3 + x_4 = 11$ in nonnegative numbers has as many solutions as trying to feed 4 (different) dogs with 11 (identical) biscuits.
Both problems are equivalent to 11 identical balls being distributed to 4 different boxes arbitrarily.
- ① F The Stirling number of the second kind $S(n, j)$ counts in how many ways we can distribute n (distinguishable) kids into j identical playpens so that no playpen is empty.

Both numbers are equivalent to n different balls being distributed to 4 indistinguishable boxes surjectively.

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."

See problem on back.

How many ways are there to deal hands of three cards to each of five different players from a deck containing 52 different cards?

First deal three card for the first player and there are $\binom{52}{3}$ ways.

Then deal three card for the second player and there are $\binom{49}{3}$ ways.

Then deal three card for the third player and there are $\binom{46}{3}$ ways.

Then deal three card for the forth player and there are $\binom{43}{3}$ ways.

Then deal three card for the fifth player and there are $\binom{40}{3}$ ways.

Overall, there are $\binom{52}{3}\binom{49}{3}\binom{46}{3}\binom{43}{3}\binom{40}{3}$ ways.