NANYANG TECHNOLOGICAL UNIVERSITY

SPMS/DIVISION OF MATHEMATICAL SCIENCES

2016/17 Semester 1 MH2500 Probability and Introduction to Statistics Tutorial 1

For the tutorial on 18 August, let us discuss

- Ex. 1.8.4, 6, 9, 17, 24, 29, 35, 38.

Ex. 1.8.4. Prove that

$$p\left(\bigcup_{i=1}^{n} A_i\right) \leq \sum_{i=1}^{n} P(A_i).$$

Ex. 1.8.6. modified

Two six-sided dice are thrown sequentially, and the face values that come up are recorded.

a. List the sample space.
b. List the elements that make up the following events: (1) $A =$ the sum of the two values is at least five but less than 8, (2) $B =$ the value of the first die is higher than the value of the second, (3) $C =$ the first value is 4.
c. List the elements of the following events: (1) $A \cap C$, (2) $B \cup C$, (3) $A \cap (B \cup C)$.

Ex. 1.8.9. The weather forecaster says that the probability of rain on Saturday is 25% and that the probability of rain on Sunday is 25%. Is the probability of rain during the weekend 50%? Why or why not?

Ex. 1.8.17. In acceptance sampling, a purchaser samples 4 items from a lot of 100 and rejects the lot if 1 or more are defective. Graph the probability that the lot is accepted as a function of the percentage of defective items in the lot. (A sketch will do.)

Ex. 1.8.24. A deck of 52 cards is shuffled thoroughly. What is the probability that the four aces are all next to each other?

Ex. 1.8.29. A poker player is dealt three spades and two hearts. He discards the two hearts and draws two more cards. What is the probability that he draws two more spades?

Ex. 1.8.35.b Prove the following identity both algebraically and by interpreting their meaning combinatorially.

$$\binom{n}{r} = \binom{n-1}{r-1} + \binom{n-1}{r}.$$

Ex. 1.8.38. What is the coefficient of x^3y^4 in the expansion of $(x+y)^7$?