

MATH 461/661 Homework 4

Due Thursday, February 19, 2015 at the beginning of lecture.

In order to receive full credit, you must (1) present the solutions in the order of the assigned problems, (2) write or type legibly, and (3) justify your answers appropriately.

1. **3.2.4**

2. Consider the experiment of rolling six six-sided dice. The sample space (S) is all length-six sequences made up of integers 1 to 6, *with* replacement. Find (a) the probability of all dice yielding the same number, and (b) the probability that all the numbers are distinct.

3. Let Y_i each be random variables given by the following functions of the outcomes in the experiment described above (in question 2). For each of these new random variables Y_i given below, describe (1) the new sample space associated with Y_i (i.e., $S_Y = Y(S)$) and (2) the Probability function $P(Y_i = k)$ for appropriate values of k .

(a) Y_1 is the number of even integers in the sequence.

(b) **(461 only)** Y_2 is the number of integers greater than 3 in the sequence.

(c) Y_3 is the number of 2s in the sequence.

(d) **(661 only)** Y_4 is the indicator function that tests if the sequence sum is less than 8.

4. **3.2.11**

5. **3.2.22**

6. **3.2.26**

7. **3.2.34 (461 only)**

3.2.35 (661 only) *Note:* The odd questions are answered in the back of the text, so points will be awarded for the justification/proof, not the formula!

8. **3.2.36**