

Probability and Statistics IEOR 4150  
Professor Guillermo Gallego  
Assignment 1

Note: There are ten problems, each counts 10 points.

1. Problems 3, 6, 7, 14, 23, 24, 29, 33, 48 of Chapter 3 (pages 80-88 in textbook).
2. Let  $S = \{1, 2, 3, 4\}$ ,  $A = \{1, 2\}$ , and  $B = \{1, 3\}$ .
  - (a) Suppose  $P(\{i\}) = i/10$ ,  $i = 1, 2, 3, 4$ . Are A and B independent?
  - (b) Suppose  $P(\{i\}) = 1/4$ ,  $i = 1, 2, 3, 4$ . Are A and B independent?
  - (c) Suppose again that  $P(\{i\}) = 1/4$ ,  $i = 1, 2, 3, 4$ . Let  $A = \{1, 2\}$ ,  $B = \{1, 3\}$  and  $C = \{1, 4\}$ . Show that A, B, and C are pair-wise independent.
  - (d) Compute  $P(A \cap B \cap C)$  and  $P(A)P(B)P(C)$ . Are these two quantities equal? What can you conclude?