1. Consider two events A and B with Pr(A) = p and Pr(B) = q, with 0 ≤ p ≤ 1 and 0 ≤ q ≤ 1.

a) Determine the maximum possible value of Pr(A ∩ B) in terms of p and q, describe the condition(s) under which this occurs, and prove that your answer is correct.

b) Determine the minimum possible value of Pr(A ∩ B) in terms of p and q, describe the condition(s) under which this occurs, and prove that your answer is correct.

2. Prove that for any two events E and F, the probability that one event occurs and the other does not can be expressed as Pr(E) + Pr(F) - 2×Pr(E ∩ F). Be sure to justify all steps in your proof.

3. Prove that for any two events G and H, Pr(G ∩ H) ≥ 1 – Pr(G^c) – Pr(H^c). Be sure to justify all steps in your proof.

Not to hand in: Consider working on exercises 1-12, 14 at the end of section 1.5 in the text. Notice that exercise 9 is #2 on this assignment.