7. What is the probability of these events when we randomly select a permutation of \{1, 2, 3, 4\}? 
   
a) 1 precedes 4.  
b) 4 precedes 1.  
c) 4 precedes 1 and 4 precedes 2.  
d) 4 precedes 1, 4 precedes 2, and 4 precedes 3.  
e) 4 precedes 3 and 2 precedes 1.  

8. What is the probability of these events when we randomly select a permutation of \{1, 2, \ldots, n\} where \(n \geq 4\)? 
   
a) 1 precedes 2.  
b) 2 precedes 1.  
c) 1 immediately precedes 2.  
d) \(n\) precedes 1 and \(n - 1\) precedes 2.  
e) \(n\) precedes 1 and \(n\) precedes 2.  

11. Suppose that \(E\) and \(F\) are events such that \(p(E) = 0.7\) and \(p(F) = 0.5\). Show that \(p(E \cup F) \geq 0.7\) and \(p(E \cap F) \geq 0.2\). 

12. Suppose that \(E\) and \(F\) are events such that \(p(E) = 0.8\) and \(p(F) = 0.6\). Show that \(p(E \cup F) \geq 0.8\) and \(p(E \cap F) \geq 0.4\).