

**CS 333202: Probability and Statistics**  
**HW12 Part I**

1. Cards are drawn from an ordinary deck of 52, one at a time, randomly and with replacement. Let  $X$  and  $Y$  denote the number of draws until the first ace and the first king are drawn, respectively. Find  $E(X \mid Y = 5)$ .
2. A fair coin is flipped 20 times. If the total number of heads is 12, what is the expected number of heads in the first 10 flips?
3. A bar of length  $\ell$  is broken into three pieces at two random spots. What is the probability that the length of at least one piece is less than  $\ell/20$ ?