

1. If  $P(A \cup B) = \frac{11}{12}$ ,  $P(A) = \frac{5}{12}$  and  $P(B^C) = \frac{1}{4}$ , find  $P(A|B)$ .
2. What can be concluded about the events  $A$  and  $B$  if  $P(A|B) = P(B|A)$ ?
3. A fair coin is tossed four times. What is the probability that exactly two heads occur given that
  - (a) the first outcome was a head?
  - (b) the first outcome was a head and the second outcome was a tail?
  - (c) the first two outcomes were heads?
4. The most common form of colorblindness is a sex-linked hereditary condition caused by a defect on the X chromosome. Thus, it is more common in males than females; 7 percent of males are colorblind but only .05 percent of females are colorblind. In a certain population 50 percent are male and 50 percent are female. Find the percentage of colorblind people that are male.
5. A company produces two different types of assortments of candy. Their two biggest sellers are "Equal Split" which is 50 percent Milky Ways and 50 percent Kit-Kats (by quantity) and "Uneven Break" which is 30 percent Milky Ways and 70 percent Kit-Kats. A store buys two boxes of Equal Split and one box of Uneven Break. Unfortunately, in transit the three boxes lost their labels. In an effort to determine which box is which, the delivery man chooses one of the three boxes at random and pulls from that box one piece of candy (at random).
  - (a) What is the probability that the piece of candy chosen was a Kit-Kat?
  - (b) If the piece of candy chosen was a Kit-Kat, what is the probability that the box chosen by the farmer was Uneven Break?
6. There are three coins in a box. One is a two-headed coin, another is a fair coin, and the third is a biased coin that flips heads 75 percent of the time. When one of the coins is selected at random and flipped, it shows heads. What is the probability that it was the two-headed coin?
7. Zoey claims that she can distinguish between Pepsi and Coke 75 percent of the time. Sasha bets that she cannot and, in fact, just guesses. To settle this a bet is made: Zoey is to be given ten small glasses, each having been filled with Pepsi or Coke, chosen by tossing a fair coin. Zoey wins the bet if she gets seven or more correct. Find the probability that Sasha wins if Zoey has the ability that she claims. Find the probability that Sasha wins if Zoey is guessing.