

April 3, 2012

1. What is the probability that a card selected at random from a deck of 52 cards is an ace or a heart?
2. What is the probability that a five-card poker hand contains the ace of hearts?
3. What is the probability that a five-card hand contains exactly one ace?
4. What is the probability that a positive integer ≤ 100 selected at random is divisible by 3?
5. Find the probability of winning the lottery by selecting the correct six integers, where the order in which these integers are selected does not matter, from the positive integers not exceeding 42.
6. Find the probability of selecting **none of** the correct six integers in a lottery, where the order in which these integers are selected does not matter, from the positive integers not exceeding 42.
7. Suppose that 100 people enter a contest and that different winners are selected at random for first, second and third prizes. What is the probability that Fred, Julie and Abigail each win a prize if each has entered the contest?
8. Two events E_1 and E_2 are called independent if $p(E_1 \cap E_2) = p(E_1)p(E_2)$. For each of the following pairs of events, which are subsets of the set of all possible outcomes when a coin is tossed three times, determine whether or not they are independent.
 - (a) E_1 : tails comes up the first time the coin is tossed
 E_2 : heads comes up when the coin is tossed the second time
 - (b) E_1 : The second coin comes up tails
 E_2 : two and not three heads come up in a row