CM 1606 Computational Mathematics

Tutorial No 11

1) Find the following basic probabilities. Clearly specify experiment, Sample space and event before you find the probability of the given event in each.
   i) Find the probability of getting 5 when rolling a fair six-sided die.
   ii) Find the probability of getting a prime number when rolling a fair six-sided die.
   iii) Find the probability of getting 7 when rolling a fair six-sided die.
2) In a simultaneous toss of two coins, find the probability of getting,
   i) Two heads
   ii) Exactly one head
3) In a single throw of two dice, what is the probability that getting sum as 9?
4) From a bag containing 10 red, 4 blue and 6 black balls, a ball is taken at random. What is the probability of getting
   i) A red ball
   ii) A black ball
   iii) Not a blue ball
5) From a well shuffled deck of 52 cards, a card is drawn at random. If A is the event of getting a king, and B is the event of getting a card bearing a number less than 5, find P(A) and P(B).
6) If two fair six-sided dice are rolled, what is the probability that the sum is
   i) 6
   ii) Less than 10
   iii) Greater than 8
   iv) 12
7) Three fair coins are tossed simultaneously. Find the probability of getting
   i) No heads
   ii) Exactly 1 head
   iii) Not more than 2 heads
   iv) All heads

8) Two identical fair dice are rolled. Consider the two events A, B and C as given below.

   A: The sum of the numbers on the faces coming up is 10

   B: Doubles are thrown

   C: The sum of the numbers on the faces coming up is not more than 8

   Find $\Pr(A \cup B)$ and $\Pr(B \cup C)$

9) In a single throw of two dice, find the probability of getting a sum of the numbers coming up as 8 or 10.

10) For an examination, any student can receive a grade out of four grades A, B, C and D from lowest to highest grade. Probability of getting each grade are 0.2,0.35, 0.35 and 0.10, respectively. Find the probability for a randomly selected student is getting at least B grade?

11) Husband and wife appear in an interview. The probability of husband's selection is 2/5 and probability of wife's selection is 1/5. Find the probability that

   a) Both will be selected

   b) None is selected

   c) At least one is selected

   d) Only one is selected

12) Two marbles are drawn at random from a bag of 6 red and 4 blue with replacement. Find the probability of getting

   i) Two red marbles

   ii) First is red and second is blue

   iii) One of them is red and the other one is blue

13) A certain statistics question is given to three students A, B and C, whose chances of solving it are ½, 1/3, and 1/5 respectively. Find the probability that the problem will be solved.

14) If A and B are two events such that P(A)=0.7, P(B)=0.6 and $\Pr(A \cap B) = 0.3$. Find

   i) $\Pr(A \cup B)$

   ii) P(A|B)

   iii) P(B|A)

15) Two cards are drawn at random from a well shuffled deck of 52 cards without replacement. Find the probability of getting first card as black and the second card as red?

16) Consider a three-child family of girls and boys.

i) Identifying all the possibilities of three child family, write the sample space.

ii) Identify the two events A and B

A: Family has exactly 2 boys

B: The first child is a boy

iii) What is the probability that the family has two boys given that the first child is a boy?

iv) What is the probability that the first child is boy given that the family has two boys?

v) What is the probability that the family has two girls given that the third child is a girl?

17) Let A and B be two events such that P(A')=1/2, P(B')=3/4 and $\Pr(A \cap B) = 1/4$. Find

i) P(A|B)

ii) P(B|A)

Challenge

What is the chance that a leap year, selected at random will contains 53 Sundays?