

HOMWORK ASSIGNMENT 6

Name:

Due: Tuesday October 29, 9 am.

Note: Homework must be submitted online on Canvas (scanned).

PROBLEM 1:

Let A , B , C be events. Find an expression and exhibit the Venn diagram for the event that:

1. A or C but not B occurs,
2. exactly one of three events occurs,
3. none of the events occurs,
4. at least two of the events occur.

PROBLEM 2:

Let a coin and a die be tossed. Let the sample space S consist of the 12 elements:

$$S = \{H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6\}.$$

Consider the following events:

- $A = \{\text{heads and an even number}\}$,
- $B = \{\text{a number less than 3}\}$,
- $C = \{\text{tails and an odd number}\}$.

Express explicitly the event that:

1. A or B occurs,
2. B and C occur,
3. Only B occurs.

PROBLEM 3:

A box contains 3 white socks and 4 red socks. Two socks are drawn at random. Find the probability that they are a match (same color).

PROBLEM 4:

Suppose 5 marbles are placed in 5 boxes at random. Find the probability that exactly 1 of the boxes is empty.

PROBLEM 5:

A class contains 10 junior students and 20 senior students of which half the juniors and half the seniors have brown eyes. Find the probability that a person chosen at random is a junior or has brown eyes.

PROBLEM 6:

Suppose A , B are events with $P(A) = 0.7$, $P(B) = 0.5$ and $P(A \cap B) = 0.4$. Find the probability that

1. A does not occur,
2. A or B occurs,
3. A but not B occurs,
4. Neither A nor B occurs.

PROBLEM 7:

Three students A , B , C are in a swimming race. A and B have the same probability of winning and each is twice as likely to win as C . Find the probability that: (a) B wins, (b) C wins, (c) B or C wins.

PROBLEM 8:

A point is chosen at random inside a circle with radius r . Find the probability that the point is at most $r/3$ from the center.

PROBLEM 9:

A pair of fair dice is tossed. If the faces appearing are different, find the probability that: (a) the sum is even, (b) the sum exceeds nine.

PROBLEM 10:

A person is dealt 3 spades from an ordinary deck of 52 cards. If she is given two more cards, find the probability that both of the cards are also spades.

PROBLEM 11:

Two marbles are selected one after the other without replacement from a box containing 3 white marbles and 2 red marbles. Find the probability that:

1. the two marbles are white,
2. The second marble is white if the first is white.

PROBLEM 12:

A box contains three coins, two of them fair and one two-headed. A coin is randomly selected and tossed twice. If heads appear both times, what is the probability that the coin is two-headed?