Recitation Week 8

1. What is the probability that in a group of 10 people at least 2 will share the birthday date? (Ignore leap years) How about a group of 60 people?

2. (Example of **Discrete infinite sample space**) Consider the positive integers $\{n : n = 1, 2, 3, \dots\}$, such that the probability of n happening is $1/2^n$ (note that the sum of the probabilities is 1). What is the probability of choosing a number greater of equal to 3?

3. (Example of **Continuous infinite sample space**). If a point is randomly chosen in the plane inside the unit circle, what is the probability that it came from the inside the circle of radius $1/2$?

4. Let A, B, C be events. Find an expression and exhibit the Venn diagram for the event: (a) A and B but not C occurs, (b) only A occurs.

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

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

   Express explicitly the following events:

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

6. Determine the probability of each event:

   (a) An even number appears in the toss of a fair die.
   (b) At least one tail appears in the toss of 3 fair coins.
   (c) A white marble appears in the random drawing of 1 marble from a box containing 4 white, 3 red and 5 blue marbles.
   (d) A box contains 15 billiard balls numbered from 1 to 15. A ball is drawn at random and the number recorded. What is the probability that the number is *even or less than* 5?