

Cankaya University
ECE307 - HW-20141023

due by Nov. 7th, 2014

1. Two numbers are selected at random from the interval $[-1, 1]$.
 - 1.1. Find the probability that the pair of numbers are inside the unit circle.
 - 1.2. Find the probability that the first number is greater than or equal to the half of the second number.
2. A die is weighted so that the outcomes produce the following probability distribution.

Outcome	1	2	3	4	5	6
Probability	0.1	0.2	0.3	0.1	0.2	0.1

Consider the events:

$A = \{\text{odd number}\}$, $B = \{2, 3, 4\}$, $C = \{x | x < 2\}$, and $D = \{x | x > 4\}$.
Find $P(A)$, $P(B)$, $P(C)$, $P(D)$.

3. A factory uses three machines A, B and C to produce certain items. Suppose,

Machine A produces 40% of the items of which 40% are defective.

Machine B produces 40% of the items of which 15% are defective.

Machine C produces 30% of the items of which 20% are defective.

- 3.1. Find the probability that a randomly selected item is defective.
- 3.2. Suppose a defective item is found among the output. Find the probability that it came from each of the machines.

4. A fair coin is tossed until the same face shows twice. Each outcome

requiring "n" tosses has the probability 2^{-n} .

4.1. Describe the sample space, S.

4.2. Check if $P(S) = 1$.

4.3. Find the prob. that the experiment ends at the 7-th toss.

4.4. Find the prob. of C, where C=Experiment ends with even number of tosses.

5. Study pages 1 - 64 of the second text book in the Syllabus (Intuitive Probability...). Run the code on pages 45-46 on your own. Plot and print the graphs for amplitudes $A=[2 \ 4 \ 8]$.

6. Define the sample spaces for the following experiments:

a) A die is thrown and the number on the top is observed.

b) Two dice are thrown and the numbers on top are observed.

c) A coin is flipped three times and the sequence of heads and tails are observed.

d) A coin is tossed until heads shows.

e) A package contains "N" components. Components are tested and defective ones are counted.

f) The voltage over a noisy electrical component is recorded for 24 hours.