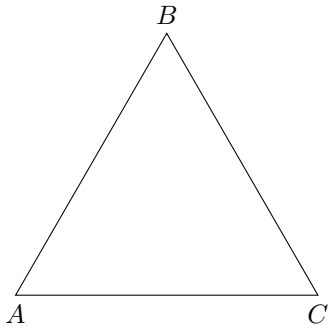
DISCRETE STRUCTURES, SPRING 2017 - PROBLEM SET 8

Name: _____

Use this worksheet as the cover sheet for your write-up: write your name on this page, and staple this sheet to the front of your homework packet.

You will receive no credit for submitting solutions that the grader cannot read and understand—be sure to write legibly!

Problem 1. Three ants are sitting on the vertices of a triangle, point A,B,C. Each of the ants can only walk along the edges of the triangle. They can only go left or right. Once they have picked a direction, they keep walking along that direction.



Whats the probability that any two ants will collide?

Problem 2. In drawing 5 random cards from a standard deck, what is the probability of getting the following hands from poker?

(a) Flush (Any five cards of the same suit, but not in a sequence).
(b) Three of a kind (Three cards of the same rank).
(c) Straight (Five cards in a sequence, but not of the same suit).

Problem 3. Answer the following questions regarding probabilities of dice and coins.

(a) In throwing two fair dice, what is the probability of a sum of 5 if they both land of a different number?
(b) A fair coin is thrown 10 times, what is the probability of getting five heads?
(c) A fair coin is thrown 10 times, what is the probability of getting at least five heads?

Problem 4. If 8 defective and 12 non defective items are inspected one by one, what is the probability that:

(a) the first 4 items inspected are defective?
(b) from the first three at least two are defective?

Problem 5. Show that if $P(A) = 1$, then $P(B|A) = A$.

Problem 6. Evaluate the following sum:

$$\sum_{k=0}^{n} \binom{n}{k} \frac{1}{k+1}$$

Date: April 18th, 2017.