# Challenge Set 1

Deadline: Jan 31 2017 at 5pm

Challenge problems are ***optional*** problems for those interested in testing their abilities. For each correct answer to a challenge question, bonus points of 0.1 are given towards the *final overall grade,* i.e., you can potentially earn up to 1.5 points towards the final grade if you get all questions correct. Proper workings must be shown to get any points, and there is no partial credit. Also, because these are bonus questions, instructors will not provide any help or hints (unlike typical problem or practice set questions where generous assistance will be provided) to be fair to all students. Please submit your solutions via email (you can simply take a good resolution photo/scan of your solutions with your student ID number and name clearly labelled) to ongsp@eng.ucsd.edu by the deadline.

Q1: An infinite triangular grid is drawn on the floor (example below). The triangles are equilateral with sides of 10 cm. A coin of 2 cm in diameter is flipped and lands on the floor. What is the probability that the coin does not cross any grid line?
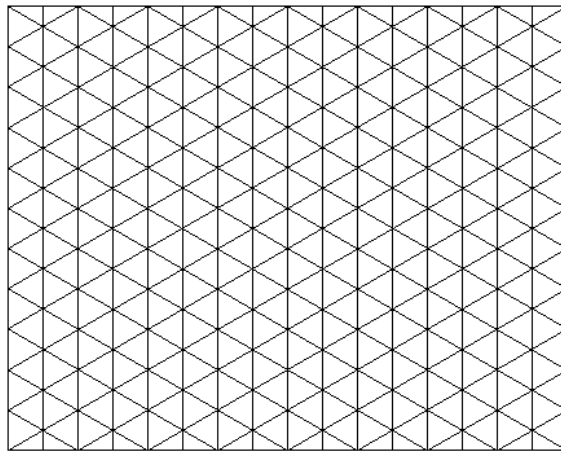
Q2: Five-card draw is a poker variant in which a player is dealt five cards. The player can choose to replace 1-3 of their cards. Note that the player can choose not to replace any cards at all too. Assume that you are using a standard deck of cards and that you are the only player. What is the probability of getting a flush (five cards of the same suit)?

Q3: Five dice D_1, D_2, D_3 D_4, D_5 each having 6 faces (1, 2, 3, 4, 5, 6) are rolled simultaneously. Find the probability that D_5 shows a number appearing on at least one of D_1, D_2, D_3, D_4.