PROBLEM SET 1

DUE ON AUGUST 21 IN TUTORIALS

Submit only those coloured blue. Those in brown may be safely omitted and are meant for the mathematically inclined. Those in white will appear in the exam.
Write the probability space before calculating any probabilities!

Problem 1. Old Indian dice have four faces numbered $1, 2, 4, 6$ (the actual shape is a long cylinder with small square base). Two dice are thrown and the numbers noted. Write the probability space assuming that the dice are fair. Let X be the random variable that measuring the sum of the numbers shown on the two dice.

(1) Let B be the event that the two dice show the same number. Find $\mathbf{P}(B)$.

(2) Let A_k be the event that X takes the value k, where k is any natural number (only a few values are possible). Find the probability of A_k.

Problem 2. A box contains one coupon labelled 1, two coupons labelled 2, and so on up to 10 coupons labelled 10. Two distinct coupons are drawn at random from the box. Write the probability space. Find the probability of the event that the two coupons carry the same number.

Problem 3. A fair die is thrown till a 6 turns up. Write the probability space and find the probability that the total number of throws is 10 or more.

Problem 4. For which of the following symbols L, M, D, B, Y, X, is it possible to write an uncountable number of them (you are allowed to write them in any size and orientation) in the plane such that no two intersect? [Clarification: For example, the answer is yes for the symbol O since it is possible to write uncountably many concentric circles.]