

## MATH 133 PROBLEM SET 7

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ABSTRACT. Due Monday, April 19

**Question 1.** Consider the game where we throw four dice and win the sum of squares of the pip counts. Compute the probability distribution function, the cumulative distribution function, the mean, the median, the mode (if any) of the distribution, skewness and kurtosis. Plot the distribution function.

**Question 2.** Same questions as in Question 1, but now, while we still throw four dice, the dice are *numbered* (from 1 to 4) and our payoff is the sum of squares of the first and third pip counts minus the sum of squares of the second and fourth pip counts.

**Question 3. – BONUS.** Write programs in R to generate the probability distributions for questions 1 and 2 and to compute all the statistics asked for.

**Question 4. – BONUS.** Write a program in R to do a generalization of question 1, where the "die" can have  $N$  sides, and there are  $M$  such dice ( $N$  and  $M$  should be inputs to your program).

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*Key words and phrases.* discrete, mathematics, sets, logic, combinatorics, graphs.