

76. A bowl contains n chips, of which d are Doritos, r are Ruffles, and t are Fritos, where $n = d + r + t$. Jane gets a serving of $k < n$ chips from the bowl. Let X_1 = the number of Doritos in Jane's serving, and X_2 = the number of Ruffles. (Chips are taken without replacement, because with replacement would be gross. It should go without saying that outcomes are unordered).
- (a) Find the joint probability mass function (joint PMF) of (X_1, X_2) .
 - (b) Find the marginal PMFs of X_1 and X_2 using the definition of marginal PMF.
 - (c) How many total Ruffles and Doritos (all together) should she expect? How many Ruffles? How many Doritos? How many Fritos?
 - (d) Suppose $n = 60, k = 12, d = 16$, and $r = 25$. Answer the previous question using these numbers.
 - (e) Is the joint PMF of only (X_1, X_2) enough to completely specify the probability distribution of all the types of chips in Jane's bowl, or is an X_3 = the number of Fritos in Jane's bowl also required? Explain.