

CS 333202: Probability and Statistics
HW11 Part II

1. Suppose that 3 balls are chosen without replacement from an urn consisting of 5 white and 8 red balls. Let X_i equal 1 if the i th ball selected is white, and let it equal 0 otherwise.

(a) Give the joint probability mass function of

i. X_1, X_2

ii. X_1, X_2, X_3

(b) Calculate the conditional probability mass function of X_1 given that

i. $X_2 = 1$

ii. $X_2 = 0$

2. Suppose that the joint density of X and Y is given by

$$f(x, y) = \begin{cases} \frac{e^{-x/y} e^{-y}}{y} & 0 < x < \infty, 0 < y < \infty \\ 0 & \text{otherwise} \end{cases}$$

Find $P(X > 1 \mid Y = y)$.

3. First a point Y is selected at random from the interval $(0, 1)$. Then another point X is selected at random from the interval $(Y, 1)$. Find the probability density function of X .