

I. An urn contains six red and four white balls. Three balls are drawn from the urn without replacement. Let the random variable X denote the number of red balls drawn. Please answer the following (11 points total)

(a) Show that $P(X = 2) = \frac{1}{2}$. (3 points)

(b) Find the probability that at least one ball drawn is red. Be sure to write this probability in terms of the random variable X . Neatly show all of your work. (4 points)

(c) Below you are given the theoretical frequencies, $f(x)$, for each value of the random variable X . Find the mean of the random variable X (i.e. the mean of the distribution of X). To receive full credit you must neatly show all of your work! (4 points)

$X = x$	0	1	2	3
$f(x) = P(X = x)$	$\frac{1}{30}$	$\frac{3}{10}$	$\frac{1}{2}$	$\frac{1}{6}$

II. Suppose A and B are events in a sample space S such that $P(A) = .45$, $P(B) = .65$, and $P(A \cup B) = .90$. Find the indicated probabilities. You must show at least one intermediate step to receive full credit. (3 points each – 9 points total)

(a) $P(A \cap B)$

(b) $P(A' \cup B')$

(c) $P(A \cap B')$