

Solution. The sample space consists of the $\binom{n}{k}$ different ways that we can select k out of the available balls. For the event of interest to occur, we have to select i out of the m red balls, which can be done in $\binom{m}{i}$ ways, and also select $k - i$ out of the $n - m$ balls that are not red, which can be done in $\binom{n-m}{k-i}$ ways. Therefore, the desired probability is

$$\frac{\binom{m}{i} \binom{n-m}{k-i}}{\binom{n}{k}},$$

for $i \geq 0$ satisfying $i \leq m$, $i \leq k$, and $k - i \leq n - m$. For all other i , the probability is zero.