

Solution for exercise 2.5.1 in Pitman

Question a) We use the hypergeometric distribution page 125 since we are dealing with sampling without replacement

$$P(\text{Exactly 4 red tickets}) = \frac{\binom{20}{4} \binom{30}{6}}{\binom{50}{10}}$$

Question b) We apply the binomial distribution (sampling with replacement page 123)

$$P(\text{Exactly 4 red tickets}) = \binom{10}{4} \left(\frac{20}{50}\right)^4 \left(\frac{30}{50}\right)^6 = 210 \frac{2^4 3^6}{5^{10}}$$