

Solution for exercise 1.6.6 in Pitman

Question a) By considering a sequence of throws we get

$$\begin{aligned}
 P(1) &= 0 \\
 P(2) &= \frac{1}{6} \\
 P(3) &= \frac{5 \cdot 2}{6 \cdot 6} \\
 P(4) &= \frac{5 \cdot 4 \cdot 3}{6 \cdot 6 \cdot 6} \\
 P(5) &= \frac{5 \cdot 4 \cdot 3 \cdot 4}{6 \cdot 6 \cdot 6 \cdot 6} \\
 P(6) &= \frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 5}{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6} \\
 P(7) &= \frac{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{6 \cdot 6 \cdot 6 \cdot 6 \cdot 6}
 \end{aligned}$$

Question b) The sum of the probabilities p_2 to p_6 must be one, thus the sum in question is 1.

Question c) Can be seen immediately.