IMM - DTU

02405 Probability
2004-5-13
BFN/bfn

Solution for exercise 3.2.3 in Pitman

Question a) Let X define the number of sixes appearing on three rolls. We find $P(X=0)=\left(\frac{5}{6}\right)^3$, $P(X=1)=3\frac{5^2}{6^3}$, $P(X=2)=3\frac{5}{6^3}$, and $P(X=3)=\frac{1}{6^3}$. Using the definition of expectation page 163

$$E(X)=\sum_{x=0}^{3} x\P(X=x)=0\cdot\left(\frac{5}{6}\right)^3+1\cdot 3\frac{5^2}{6^3}+2\cdot 3\frac{5}{6^3}+3\cdot\frac{1}{6^3}=\frac{1}{2}$$

or realizing that $X\in$ *binomial* $\left(3,\frac{1}{6}\right)$ example 7 page 169 we have $E(X)=3\cdot\frac{1}{6}=\frac{1}{2}$.

Question b) Let Y denote the number of odd numbers on three rolls, then $Y\in$ *binomial* $\left(3,\frac{1}{2}\right)$ thus $E(Y)=3\cdot\frac{1}{2}=\frac{3}{2}$.