P45.

28.

递推

$P_{n+1} = P_n \cdot 0 + (1-P_n)\frac{1}{3}$

$= -\frac{1}{3}P_n + \frac{1}{3}$

$\therefore P_{n+1} - \frac{1}{4} = -\frac{1}{3}(P_n - \frac{1}{4})$

$\therefore P_n = (P_0 - \frac{1}{4})\cdot(-\frac{1}{3})^n + \frac{1}{4}$

且 $P_0 = 1$

$\therefore P_n = \frac{3}{4}\cdot(-\frac{1}{3})^n + 1$

将 $n=7$ 代入，得：$P_7 = \frac{182}{729}$

31.

设 A = 取出全是白球

B = 掷出3点

$P(A) = \frac{1}{6}\frac{C_4^1}{C_{10}^1} + \frac{1}{6}\frac{C_4^2}{C_{10}^2} + \frac{1}{6}\frac{C_4^3}{C_{10}^3} + \frac{1}{6}\frac{C_4^4}{C_{10}^4}$

$= \frac{1}{6}\times\frac{4}{10} + \frac{1}{6}\frac{6}{45} + \frac{1}{6}\times\frac{4}{120} + \frac{1}{6}\times\frac{1}{210} = \frac{2}{21}$

$P(AB) = \frac{1}{6}\times\frac{C_4^3}{C_{10}^3} = \frac{1}{180}$

$P(B|A) = \frac{P(AB)}{P(A)} = \frac{7}{120}$

35.

设 A = A写上加号

B = 主持人看到加号

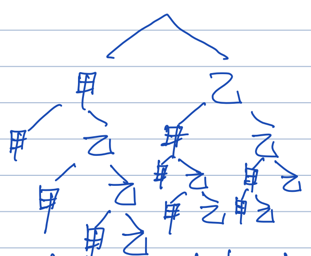
$P(AB) = \frac{1}{3}\times[\frac{1}{3}\times\frac{1}{3}\times\frac{1}{3} + \frac{1}{3}\times\frac{2}{3}\times\frac{2}{3} + \frac{2}{3}\times\frac{2}{3}\times\frac{1}{3} + \frac{2}{3}\times\frac{1}{3}\times\frac{2}{3}]$

$= \frac{1}{3}\times[\frac{1}{27} + \frac{4}{27} + \frac{4}{27} + \frac{4}{27}]$

$= \frac{13}{81}$

$P(B) = \frac{2}{3}\times\frac{14}{27} + \frac{13}{81} = \frac{41}{81}$

$P(A|B) = \frac{13}{41}$



36.

$P(\text{甲得冠军}) = \frac{1}{2}\times\frac{1}{2} + \frac{1}{2}\times\frac{1}{2}\times\frac{1}{2} + \frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2} + \frac{1}{2}\times\frac{1}{2}\times\frac{1}{2} + \frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2} + \frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}$

$= \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{8} + \frac{1}{16} + \frac{1}{16} = \frac{11}{16}$

$P(\text{乙得冠军}) = \frac{5}{16}$

37.

$P = 0.8\times0.2\times0.2\times0.3 + 2\times0.8\times0.8\times0.2\times(1-0.7\times0.7) + 0.8\times0.8\times0.8\times(1-0.7\times0.7\times0.7)$
$= 0.476544$

P96

2.

$\because$ 成反比 $\therefore$ 设 $P(X=k) = \frac{a}{k(k+1)}$

则 $\sum_{1}^{\infty} P(X=k) = a$
$\therefore a = 1$

而 $P(X \le k)$ $(k \in Z$ 且 $k \ge 1) = \frac{k}{k+1}$

3.

$P(X=1) = \frac{3}{C_4^2} = \frac{1}{2}$

$P(X=2) = \frac{2}{C_4^3} = \frac{1}{3}$

$P(X=3) = \frac{1}{C_4^3} = \frac{1}{6}$

$\therefore$

X	1	2	3
P	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{6}$

6.

X 可能取值为 0. 1. 2. 3

$P(X=0) = \frac{9}{12} = \frac{3}{4}$

$P(X=1) = \frac{3}{12}\times\frac{9}{11} = \frac{9}{44}$

$P(X=2) = \frac{3}{12}\times\frac{2}{11}\times\frac{9}{10} = \frac{9}{220}$

$P(X=3) = \frac{3}{12}\times\frac{2}{11}\times\frac{1}{10}\times1 = \frac{1}{220}$

$\therefore$

X	0	1	2	3
P	$\frac{3}{4}$	$\frac{9}{44}$	$\frac{9}{220}$	$\frac{1}{220}$

12.

掷三颗骰子点数和为奇数的概率为 $\frac{1}{2}$

属于几何分布,由期望可知,平均需要 2次

16. 本题即为求二项分布中奇项减偶项的概率

令 $q = 1-p$

则 $(p+q)^n = C_n^0 q^n + C_n^1 p q^{n-1} + \dots + C_n^n p^n$

$(q-p)^n = C_n^0 q^n - C_n^1 p q^{n-1} + \dots + (-1)^n C_n^n p^n$

可得 $EY = (1-2p)^n$

补充

共7次试验，最后一次一定是失败的

$\therefore C_6^2 \cdot (0.4)^3 \times (0.6)^4$

$= 0.124416$