概率、排列與組合練習 / Probability, permutations and combinations

SketchMath 原創中英練習 / Original bilingual practice · Not official HKEAA papers

先判斷次序是否重要；不放回抽樣會改變下一次的條件概率。
Decide whether order matters; sampling without replacement changes the next conditional probability.

1.

5 人中選 3 人組成小組有多少種？若改為選不同的主席及秘書呢？
How many groups of 3 can be chosen from 5 people? How many ways can a chair and secretary be assigned?

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2.

袋內有 3 紅球、2 藍球，不放回抽兩球。求兩球皆紅及至少一球藍的概率。
A bag has 3 red and 2 blue balls. Draw twice without replacement. Find P(two red) and P(at least one blue).

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3.

P(A)=0.4、P(B)=0.5、P(A∩B)=0.2。判斷是否獨立，並求 P(A|B)。
P(A)=0.4, P(B)=0.5 and P(A∩B)=0.2. Test independence and find P(A|B).

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答案及詳解 / Worked solutions

1.

1. 小組不計次序：C(5, 3) = 10。
   Order does not matter for the group: C(5, 3) = 10.
2. 主席有 5 個選擇，秘書有餘下 4 個：5 × 4 = 20。
   There are 5 choices for chair and 4 remaining choices for secretary: 5 × 4 = 20.

小組 10 種；職位安排 20 種。
10 groups; 20 role assignments.

2.

1. P(兩紅) = (3/5)(2/4) = 3/10。
   P(two red) = (3/5)(2/4) = 3/10.
2. 至少一藍是「兩紅」的補事件：1 − 3/10。
   At least one blue is the complement of two red: 1 − 3/10.

3/10；7/10。
3/10; 7/10.

3.

1. 0.4 × 0.5 = 0.2，所以 A、B 獨立。
   0.4 × 0.5 = 0.2, so A and B are independent.
2. P(A|B) = 0.2/0.5 = 0.4。
   P(A|B) = 0.2/0.5 = 0.4.

獨立；P(A|B)=0.4。
Independent; P(A|B)=0.4.