

香港培正中學第三屆數學邀請賽

Pui Ching Middle School 3rd Invitational Mathematics Competition

乙部樣本試題

Sample Question for Section B

---

現要把一個正方體的八個頂點編號為 1 至 8，並把每個面塗上顏色。

The eight vertices of a cube are to be labelled with the integers 1 to 8, and each face is to be coloured.

- (a) 若我們計算每面四個頂點的編號之和，所得的和的最小可能值是甚麼？ (2 分)

If the sum of the four labels on each face is calculated, what is the minimum sum that can be obtained? (2 marks)

- (b) 若相鄰的面必須塗上不同的顏色，最少需要多少種不同的顏色？ (4 分)

If it is required that adjacent faces be assigned different colours, what is the smallest number of colours needed? (4 marks)

- (c) 若同一個面上任意三個頂點的編號之和均不小於 10，求同一個面上四個頂點的編號之和的最小可能值。 (7 分)

If the sum of any three labels on the same face is not less than 10, find the minimum possible sum of the four labels on each face. (7 marks)

- (d) 若每面四個頂點的編號之和必須相同，共有多少種不同的編號方法？(兩種編號方法中，若可適當旋轉立體使得對應頂點的編號相同，則視為同一種方法。) (7 分)

If it is required that the sum of the four labels on every face be the same, how many different ways of labelling are there? (Two labellings are said to be the same if it is possible to rotate the cubes suitably so that corresponding vertices have the same labels.) (7 marks)

答案 Answers: (a) 10 (b) 3 (c) 16 (d) 6

備註：

**Remarks:**

1. 乙部的每題在同一主題下設 4 小題，每題共佔 20 分。

Each question in Section B contains 4 parts set under the same theme and the total score is 20.

2. 每小題佔分介乎 2 至 7 分，分數會在試題中顯示出來。

Each part carries 2 to 7 marks, and the score allocated to each part will be shown in the question paper.

3. 參賽者應注意一點：雖然 4 小題均在同一主題下設題，但在一般情況下它們均沒有直接的關連。因此，即使參賽者不能解答某一小題，作答其他小題時亦不會受影響。

Contestants should note that the 4 parts, despite set under the same theme, are in general not directly related. As a result, failure to solve one part should not affect the other parts.