

學校名稱：School Name:

第十八屆香港小學數學創意解難比賽

The 18th Hong Kong Mathematics Creative Problem
Solving Competition for Primary Schools

決賽

Final Event

背景資料 Background



薯片的包裝袋由一張長方形的錫箔材質膠片密封而成。很多消費者常常埋怨，一大包薯片，龐大的體積內裡只得數片的薯片，餘下的全是空氣【實為食品級氮氣（氮氣濃度不少於 99%）】。

The packaging of potato chips is sealed with a rectangular sheet of tin foil. Many consumers often complain that in a large bag of potato chips, there are only a few chips inside the huge volume, while the rest is air, actually food-grade nitrogen gas (with a nitrogen concentration of not less than 99%).

試估算一下由大會提供的一包薯片所含「空氣」與食物的比例。

Let's try to estimate the ratio of "air" to food in the bag of potato chips provided by the organiser.

甲部(20分)

PART A (20 Marks)

1) 每包薯片的體積 Volume of each bag of potato chips

試利用數學的方法估算一下每包薯片的體積，並把你們測量體積所運用的方法簡單描述一下。

Try using mathematical methods to estimate the volume of each bag of potato chips, and briefly describe the method you used to measure the volume.

(4分)

(4 Marks)

每包薯片的體積約_____立方厘米。

The volume of each bag of potato chips is _____ cm^3 .

測量體積所運用的方法：

The method used to measure the volume:

2) 每包薯片內「薯片」的體積 **Volume of "potato chips" inside each bag**

試利用數學的方法估算一下每包薯片內「薯片」的體積，並把你們測量體積所運用的方法簡單描述一下。

Try using mathematical methods to estimate the volume of "potato chips" inside each bag, and briefly describe the method you used to measure the volume.

(8 分)

(8 Marks)

每包薯片內「薯片」的體積約_____立方厘米。

The volume of "potato chips" inside each bag is approximately _____ cm³.

測量體積所運用的方法：

Method used to measure the volume:

- 3) 每包薯片所含「空氣」與食物的比例(假設錫箔材質膠片不佔每包薯片的體積)
Ratio of "air" to food in each bag of potato chips (Assuming that the tin foil material does not occupy any volume of each bag of potato chips)

(8分)
(8 Marks)

每包薯片內「薯片」的體積約_____立方厘米。
The volume of "potato chips" inside each bag is approximately _____ cm³.

每包薯片內「空氣」的體積約_____立方厘米。
The volume of "air" inside each bag is approximately _____ cm³.

每包薯片所含「空氣」與食物的比例為 _____
The ratio of "air" to food in each bag of potato chips is _____

每包薯片內「薯片」的體積佔全部體積的_____ %
The volume of "potato chips" inside each bag as a percentage of the total volume is approximately _____ %.

每包薯片內「空氣」的體積佔全部體積的_____ %
The volume of "air" inside each bag as a percentage of the total volume is approximately _____ %.

乙部(30分)

PART B (30 Marks)

4) 長方形錫箔材質膠片與體積的關係

Relationship between the volume and rectangular tin foil material in potato chip packaging

Try to identify the relationship between the rectangular tin foil material and the volume in potato chip packaging, and briefly describe your findings.

請在下表填上以下問題的答案：

Please write down the results of the following questions in the table below:

- (a) 以相同的包裝方法，但把長方形錫箔材質膠片的長度和闊度以三種尺寸更改，並估算包裝袋的體積。

Use the same packaging method. Vary the length and the width of the rectangular materials with three different dimensions and estimate the volume of the bag.

- (b) 估算每包裝袋內薯片的體積。

Estimate the volume of "potato chips" that can be stored in each of the bags.

- (c) 估算長方形錫箔材質膠片的面積。

Estimate the area of the rectangular materials used.

		尺寸一 Dimension 1	尺寸二 Dimension 2	尺寸三 Dimension 3
(a)	長方形錫箔材質膠片的 長度和闊度 Length and width of the rectangular materials			
	包裝的體積 Volume of the bag			
(b)	可容納薯片的體積 Volume of potato chips can be stored			
(c)	長方形錫箔材質膠片的 面積 The area of the rectangular materials			

(15分)
(15 Marks)

(d) 試找出薯片包裝中，長方形錫箔材質膠片與體積的關係，並簡單描述你們的發現。

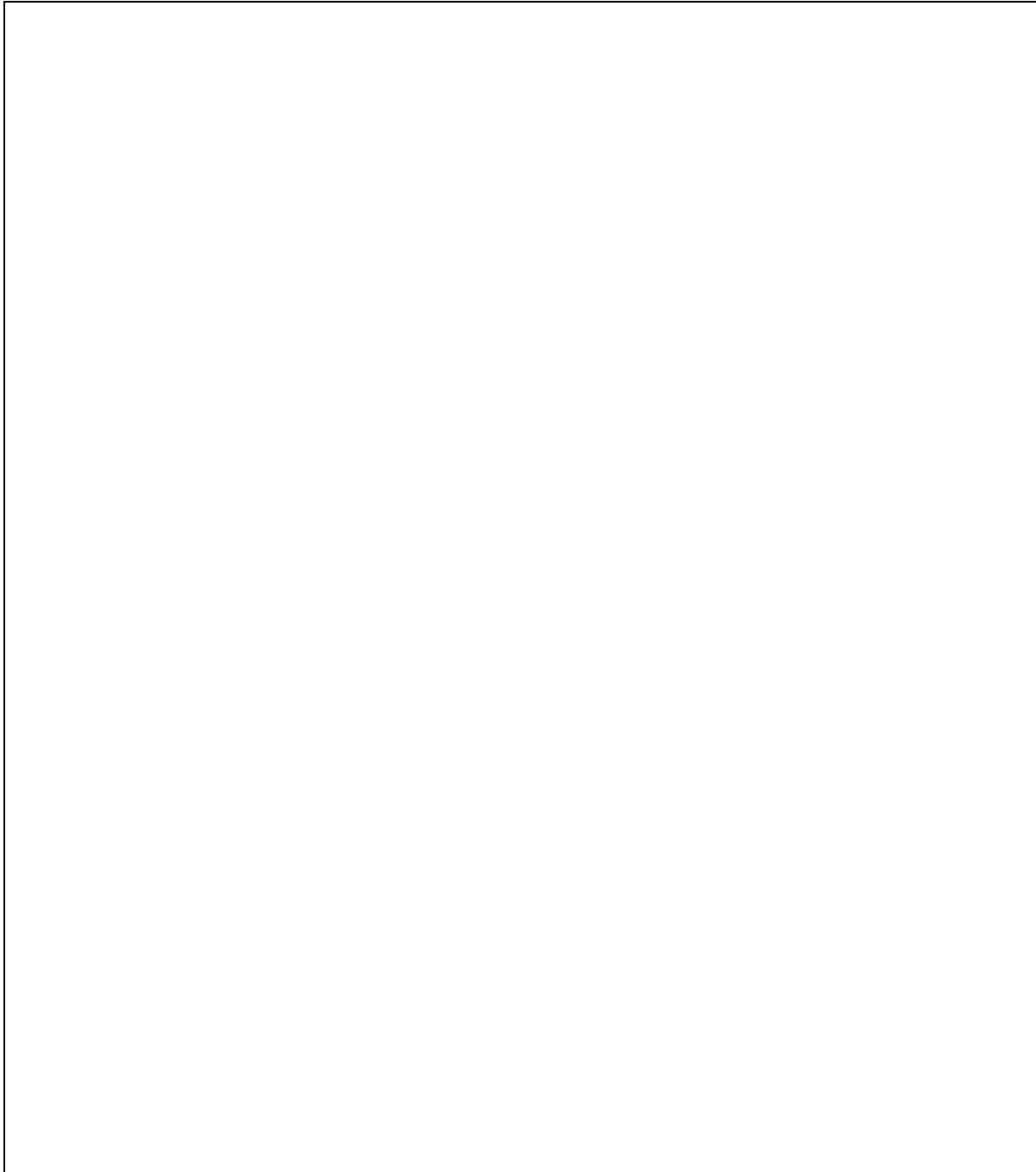
(評審會按你們答案的理順和清晰與否給予評分。)

Try to identify the relationship between the rectangular tin foil materials and the volume in potato chip packaging, and briefly describe your findings.

(Marks will be given to the organization and the clarity of your works.)

(15 分)

(15 Marks)



丙部 (50 分)
PART C (50 Marks)

5) 為薯片設計新包裝 Designing a new packaging for potato chips

假設評審是薯片公司的老板，他們將售賣 200 克(A 包裝)及 300 克(B 包裝)的薯片。
Suppose the judges are the owners of the company selling potato chips of weights 200 g (Bag A) and 300 g (Bag B).

設計可容納 200 克(A 包裝)及 300 克(B 包裝)薯片的薯片袋。
Design the potato chip bags which can store potato chips of 200g (Bag A) and 300g (Bag B).

設計一種以最少材料能製作最大體積的薯片袋(C 包裝)。
Design a packaging for potato chips that maximizes the volume while minimizing the use of materials. (Bag C)

請清楚描述你在第九頁至第十頁的設計。你可以把你的設計命名，繪劃出你設計的包裝，寫低包裝的尺寸，估算包裝的體積等。

在答問環節，同學需要游說評審去採納他們設計的包裝。

Clearly describe each of your designs in the boxes on p.9 - p.10. You can give a name to your design, draw the bag, write down the dimensions, estimate the volume, etc.

In the Q&A session, you are going to persuade the judges to use your designs.

(同學可使用大會提供的 A3 紙、膠紙及水彩筆。)

(Students can make use of the A3 papers, tapes and colour pens supplied by the organiser.)

評審將根據以下範疇評分：

The judges will give score according to the following domains:

文字表達 Written works	10 分 10 Marks
最終產品 Final product	10 分 10 Marks
口頭匯報 Presentation	10 分 10 Marks
STEAM 範圍知識 STEAM area knowledge	10 分 10 Marks
數學建模 Mathematical modeling	10 分 10 Marks

A 包裝 Bag A

B 包裝 Bag B

C 包裝 Bag C

答卷完 End of Paper