

第十一屆全港小學數學挑戰賽(2024-2025)
The 11th Hong Kong Primary Mathematics Challenge (2024-2025)

決賽（二零二四年十二月七日）
Final (7th December, 2024)

小六組 Primary 6	組別項目 Group Event	試卷 Question Paper
--------------------------------	-----------------------------------	------------------------------------

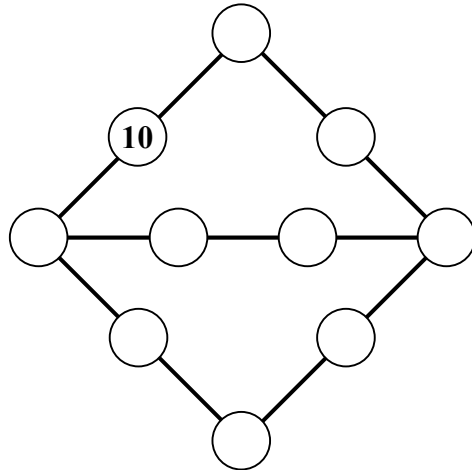
參賽者須知 Instructions to Contestants

1. 在比賽過程中，參賽者必須將准考證放在桌上。
You should place your Admission Form on your desk for the whole session.
2. 於比賽期間必須關掉所有手提電話、通訊工具及其他響鬧裝置。
During the competition, you should switch off your mobile phone and any other electronic or communication devices that can emit sound.
3. 本項目以筆試形式舉行，須於限時 45 分鐘內完成所有題目。
Contestants should finish all questions in this 45-minutes written test.
4. 在答題紙上填寫學校名稱、參賽者姓名、參賽者編號、座位編號。
Write your name, admission number, seat number and school name on the front cover of your answer sheet.
5. 參賽者於比賽時只准使用大會提供之草稿紙。
You can only use the rough work sheet provided by the organizer.
6. 參賽者不可於比賽中使用計算機。
The use of calculators is NOT allowed.
7. 每題只需把答案填寫在大會提供之答題紙上，否則不予評分。參賽者不需填寫計算步驟。
Put your answers on the answer sheet provided, otherwise, the answers will not be marked. You are not required to show the steps in your calculations.
8. 作答時，每題的答案均須以 0 至 9999 之間的整數表示，小於 1000 的答案均須補「0」以湊足四位數字。
Each answer must be given as an integer between 0 and 9999. In case of an answer less than 1000, leading zeros should be included to make up four digits.
9. 除特殊情況外，參賽者於本項目完結前不能提早交卷或離場。
Under normal circumstances, contestants are not allowed to leave the contest venue before the end of this session.
10. 違反比賽規則者有可能被取消參賽資格。
Any contestant who violates the rules and regulations of the competition might risk disqualification.
11. 參賽者如對比賽過程或試題內容有任何疑問或爭議，參賽者須於當天比賽結束後立即向大會提出，否則不予受理。大會保留是次比賽的所有最終決定權。
If you have any queries, you should contact the officer-in-charge immediately after the competition. Late queries will not be entertained. The decision of the organizing committee will be final.

時限：45 分鐘
Time Allowed: 45 minutes

總分：400
Total marks: 400

1. 在下圖中 9 個空白圓圈中分別填上 1 到 9 的不同數字，使得每條直線上的數字總和為 16。求水平線上 4 個圓圈中 4 個數字的乘積。 (16 分)
Fill the 9 blank circles in the figure with a different number from 1 to 9 such that the sum of the numbers on each straight line is 16. Find the product of 4 numbers in the 4 circles on the horizontal line. (16 marks)

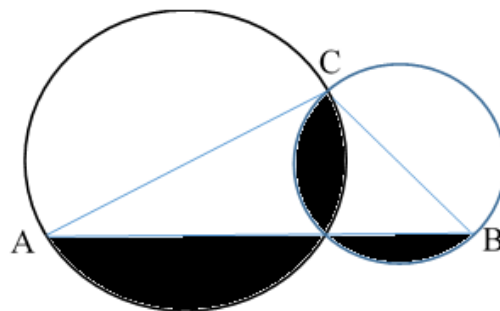


2. 求 $\frac{2}{a} + \frac{1}{b} = \frac{1}{15}$ 的正整數解的數目。 (20 分)

Find the number of positive integral solutions of the equation $\frac{2}{a} + \frac{1}{b} = \frac{1}{15}$. (20 marks)

3. 在下圖中， AC 和 BC 分別為兩圓的直徑，且 $AC > BC$ 。已知 AC 和 BC 的長度為整數及 $\angle C$ 是直角，若 $\triangle ACB$ 的面積為 96 cm^2 ，求陰影部分的最小面積。 ($\pi = 3.14$) (24 分)

In the following figure, AC and BC are the diameter of two circles which $AC > BC$. It is given that the length of AC and BC is integer and $\angle C$ is a right angle. If the area of $\triangle ACB$ is 96 cm^2 , find the minimum area of the shaded part. ($\pi = 3.14$) (24 marks)



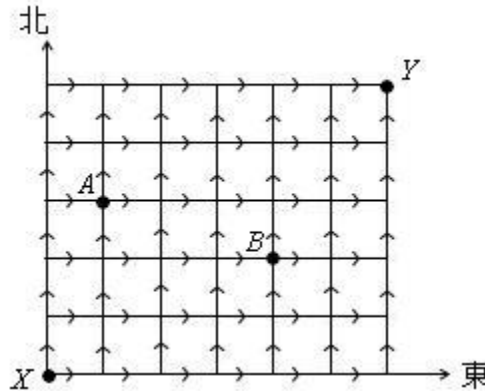
4. 在 1 至 2024 中可以能被 3 或 7 整除的數字有多少個? (22 分)
How many integers are there from 1 to 2024 which are divisible by 3 or 7? (22 marks)
5. 求 6^{2024} 被 13 除的餘數。 (22 分)
Find the remainder when 6^{2024} is divided by 13. (22 marks)

6. 下圖是從大廈 X 到大廈 Y 的道路網，在每個路口都只能選擇向東或向北前進。

由 X 經 A 到 Y 與由 X 經 B 到 Y 相差多少條路線？

(24 分)

The following diagram is a road network from Building X to Building Y. You can only choose to go East or North at every intersection. If choose from X to Y via A and from X to Y via B, how much difference is there between the two routes? (24 marks)



7. 求 $30 + \frac{30}{1+2} + \frac{30}{1+2+3} + \frac{30}{1+2+3+4} + \dots + \frac{30}{1+2+3+4+\dots+19}$ 的值。

(24 分)

Evaluate $30 + \frac{30}{1+2} + \frac{30}{1+2+3} + \frac{30}{1+2+3+4} + \dots + \frac{30}{1+2+3+4+\dots+19}$.

(24 marks)

8. 把 0, 1, 2, 3, 4, 5 六個數字填入以下的直式的 \square 內，求相乘後最大的積。

(20 分)

Fill the six numbers 0, 1, 2, 3, 4 and 5 into \square of the following expression to maximize the product after multiplication. Find that product.

(20 marks)

$$\begin{array}{r} \square \square \square \\ \times \square \square \square \\ \hline \end{array}$$

(Maximum product)

9. 一輛單車在前面以固定的速率行駛，有一輛汽車在後面追趕。如果汽車速率是每小時 30 公里，便要花 1 小時才能追上；如果汽車速率是每小時 35 公里，則要花 40 分鐘才能追上。問單車的速率是多少？

(20 分)

A bicycle is moving at a constant speed in front, with a car chasing behind. If the car speed is 30 km/h, it will take 1 hour to catch up. If the car speed is 35 km/h, it will take 40 minutes to catch up. Find the speed of the bicycle.

(20 marks)

10. 某工程由甲做單獨做 57 天，再由乙單獨做 29 天可以完成，若甲乙兩人合做需要 36 天完成，現在甲先單獨做 24 天，然後再由乙單獨接著做，還需多少天可以完成？

(26 分)

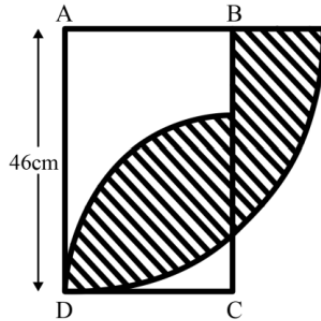
A project can be completed in 57 days by A alone, then 29 days by B alone. If A and B can finish it together in 36 days, now A does it alone for 24 days, then B does it alone, how many more days will it take to complete?

(26 marks)

11. 下圖中，長方形 $ABCD$ 的面積是 2024 cm^2 ，長是 46 cm ，求圖中陰影部份的面積是多少 cm^2 ？(取 $\pi = 3$) (30 分)

In the following figure, the area of rectangle $ABCD$ is 2024 cm^2 and the length is 46 cm .

What is the area of the shaded part in the figure? (Take $\pi = 3$) (30 marks)



12. 將 $\frac{156}{2028}$ 化成小數，小數點後第 2024 個位的數字是甚麼？ (30 分)

Convert $\frac{156}{2028}$ into a decimal. What is the digit in the 2024th position after the decimal point?

(30 marks)

13. 已知有兩個連續正整數，其平方和等於 169^2 。求兩數中較小的那個。 (32 分)

There are two consecutive positive integers. The sum of the squares of these two numbers equals 169^2 . Find the smaller of the two numbers. (32 marks)

14. 假設有 9 隻兔子，現需將它們分成 3 組，每組有 3 隻兔子。每次分組時，每組中的每一隻兔子都不能相遇多過一次。共有多少個組合的方法？ (30 分)

Assume there are 9 rabbits and we need to divide them into 3 groups, each with 3 rabbits. During each grouping, no rabbit in any group can meet any other rabbit more than once. How many ways can this be done? (30 marks)

15. 已知一個正整數數列滿足：第一項為 1、第二項為 2、第三項為 3，且從第二項開始的每一項的平方恰等於兩個相鄰項之和（例如，對於第二項我們有 $2^2 = 1 + 3$ ）。請問第 2024 項除以 11 所得到的餘數是多少？ (32 分)

There is a sequence of positive integers. The first term of the sequence is 1, the second term is 2, the third term is 3 and the square of each number starting from the second one equals the sum of the two neighboring terms. For example, for the second term we have that: $2^2 = 1 + 3$. What is the remainder when the 2024th term is divided by 11? (32 marks)

16. 將 200×200 方格表中的每一個小方格內部塗上 40 種顏色中的一種顏色。若一個小方格內的顏色與同一行、同一列中的其它小方格內的顏色都不同，則稱這個小方格為特別的。請問此方格表中最多可以有多少個特別的小方格？ (28 分)

Each cell of a 200×200 grid is painted in one of 40 colours. A cell is said to be special if its colour is different from the colour of every other cell in the same row and different from the colour of every other cell in the same column. What is the largest possible number of special cells in the grid? (28 marks)

試卷完 END OF PAPER