

第十屆全港小學數學挑戰賽(2023-2024)
The 10th Hong Kong Primary Mathematics Challenge (2023-2024)

決賽 (二零二三年十二月二日)
Final (2nd December, 2023)

小六組 個人項目 試卷
Primary 6 Individual Event 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：100
Total marks: 100

1. 求以下算式的值。
Find the value of the following expression. (3 分)
(3 marks)

$$2023 \times \left(\frac{1}{2023} + \frac{1}{2024} \right) \times 2024 =$$

2. 某一種電子表在 12 點 35 分時，顯示「12:35」。那麼在上午 10 點至 11 點這段時間內，電子表上四個數字都不相同的情況有多少種。
A certain electronic watch displays "12:35" at 12:35. So during the period from 10 a.m. to 11 a.m., how many situations are there in which the four numbers on the electronic watch are different? (5 分)
(5 marks)

3. 若 $\frac{1 \times 2 \times 3 + 11 \times 22 \times 33 + 111 \times 222 \times 333 + 1111 \times 2222 \times 3333}{5 \times 6 \times 7 + 55 \times 66 \times 77 + 555 \times 666 \times 777 + 5555 \times 6666 \times 7777} = \frac{a}{b}$ ， $\frac{a}{b}$ 為最簡真分數，計算 $a+b$ 的值。
(5 分)

If $\frac{1 \times 2 \times 3 + 11 \times 22 \times 33 + 111 \times 222 \times 333 + 1111 \times 2222 \times 3333}{5 \times 6 \times 7 + 55 \times 66 \times 77 + 555 \times 666 \times 777 + 5555 \times 6666 \times 7777} = \frac{a}{b}$, $\frac{a}{b}$ is simplified proper fraction, find the value of $a+b$. (5 marks)

4. 有一五位數 $\overline{a192b}$ 能被 18 整除，其中 a 比 b 大 3，求 $a+b=?$
There is a 5 digit number $\overline{a192b}$ is divisible by 18 and a greater than b by 3, then $a+b=?$ (4 分)
(4 marks)

5. $1 \times 2 \times 3 \times 4 \times \dots \times 48 \times 49 \times 50$ 的結果為整數 N 。
已知 N 的最右邊數字為 0，問 N 的最右邊有多少個 0？
The result of $1 \times 2 \times 3 \times 4 \times \dots \times 48 \times 49 \times 50$ is an integer N . It is known that the rightmost digit of N is 0. How many "0" are there on the rightmost side of N ? (3 分)
(3 marks)

6. 設 $\overline{2024A50A6}$ 可同時被 3 及 8 整除，求 A 的值。
Find the value of A if $\overline{2024A50A6}$ is divisible by 3 and 8. (3 分)
(3 marks)

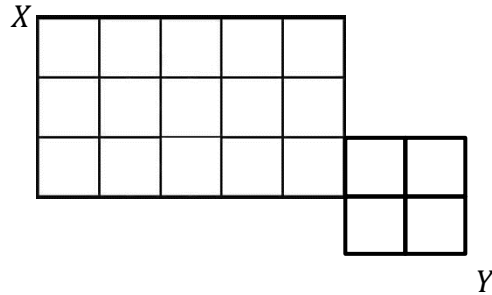
7. 有五張卡片，分別寫著數字 1、3、5、6、8。現從中取出 3 張卡片，並排放在一起，組成一個三位數，如 $\overline{1, 6, 5}$ ，問可以組成多少個不同的奇數。
There are five cards, written on them 1, 3, 5, 6, and 8 respectively. Three cards are drawn from them and are used to form a three-digit number like $\overline{1, 6, 5}$. How many odd numbers can be formed? (5 分)
(5 marks)

8. 求 $478 \times 296 \times 351$ 除以 17 的餘數。
Find the remainder of $478 \times 296 \times 351$ divided by 17. (5 分)
(5 marks)

9. 已知一正六邊形和一正三角形的周界相等。若果該正六邊形面積是 600 平方單位，求正三角形的面積。
It is given that the perimeters of a regular hexagon and an equilateral triangle are the same. If the area of the hexagon is 600 square units, find the area of the triangle. (5 分)
(5 marks)

10. 計算 $2^{2023} - (2^{2022} + 2^{2021} + 2^{2020} + \dots + 2^3 + 2^2 + 2 + 1)$ 之值。 (4 分)
 Find the value of $2^{2023} - (2^{2022} + 2^{2021} + 2^{2020} + \dots + 2^3 + 2^2 + 2 + 1)$. (4 marks)

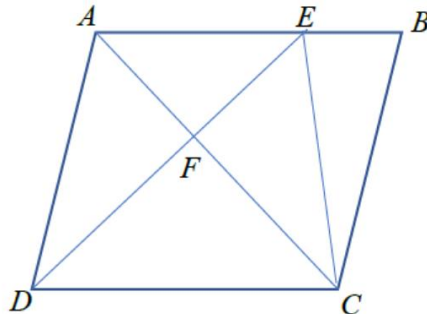
11. 如圖，從 X 點到 Y 點的最近路線有多少條？ (4 分)
 In the figure, how many shortest routes from point X to point Y? (4 marks)



12. 若 $\frac{9}{10} = \frac{1}{A} + \frac{1}{B} + \frac{1}{C}$ ，其中 A 、 B 、 C 為相異的正整數且 $C > B > A$ ，求 $A+B+C$ 的值。 (6 分)

If $\frac{9}{10} = \frac{1}{A} + \frac{1}{B} + \frac{1}{C}$, where A , B and C are distinct positive integers such that $C > B > A$, find the value of $A+B+C$. (6 marks)

13. 若平行四邊形 $ABCD$ 的面積為 24 cm^2 且 ΔEBC 的面積為 ΔAEF 面積的 8 倍，求 ΔFDC 面積的最大值。 (7 分)
 If the area of the parallelogram is 24 cm^2 and the area of ΔEBC is two times ΔAEF , find the greatest area of ΔFDC . (7 marks)



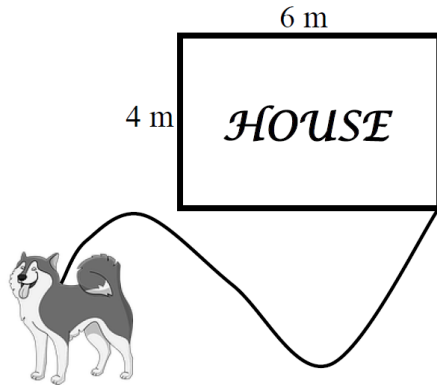
14. 求 $(2-1) \times (2-\frac{2}{3}) \times (2-\frac{2}{4}) \times \dots \times (2-\frac{2}{16})$ 的值。 (5 分)
 Find the value of $(2-1) \times (2-\frac{2}{3}) \times (2-\frac{2}{4}) \times \dots \times (2-\frac{2}{16})$. (5 marks)

15. 求 6^{2023} 被 7 除的餘數。 (6 分)
 Find the remainder when 6^{2023} is divided by 7. (6 marks)

16. 8 個人用 35 天完成一項工程的 $\frac{1}{3}$ 。此時又增加 6 個人，那麼要完成剩餘的工程，還需要幾天？ (6 分)
 8 people completed $\frac{1}{3}$ of a project in 35 days. At this time, 6 more people were added. How many days would it take to complete the remaining works? (6 marks)

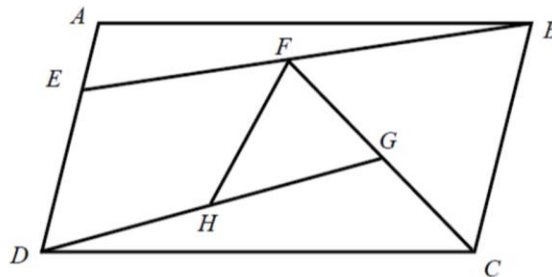
17. 一隻狗被一條 10 m 長且沒有彈性的皮帶拴在一間長方形房子的轉角處，如下圖所示。如果房子的長與寬分別是 6 m 與 4 m，求這隻狗可以到達的區域之面積？(取 $\pi = 3$ 。)
(7 分)

A dog is tied to a 10 m inextensible rope in one corner of a rectangular house, as shown in the figure. If the length and the width of the house are 6 m and 4 m, respectively. What is the area of the region where the dog can move? (Take $\pi = 3$.)
(7 marks)



18. 在矩形 $ABCD$ 中， E 是 AD 上的點，滿足 $ED = 3AE$ ， F 是 BE 的中點， G 是 CF 的中點， H 是 DG 中點。若三角形 FGH 的面積為 35 cm^2 ，請問四邊形 $DEFH$ 的面積為多少？
(9 分)

In the rectangle $ABCD$, E is a point on AD such that $ED = 3AE$, F is the midpoint of BE , G is the midpoint of CF , and H is the midpoint of DG . If the area of triangle FGH is 35 cm^2 , what is the area of quadrilateral $DEFH$?
(9 marks)



19. 烏龜和白兔同時由 A 鎮出發前往 B 鎮。當白兔跑了 12 分鐘到達路程一半的一棵樹時，發現烏龜遙遙墮後，於是便立即在樹下睡著。當白兔睡醒時，烏龜剛剛到達 B 鎮。白兔繼續前往 B 鎮，而烏龜亦回頭尋找白兔。結果烏龜用了走完全程時間的 $\frac{1}{16}$ 便和白兔再相遇。假設白兔除了睡著時和烏龜全程均以勻速前進，請問白兔睡了多少分鐘？(8 分)

The turtle and the white rabbit set off from town A to town B at the same time. When the white rabbit ran for 12 minutes and reached a tree in the halfway, he found that the turtle had fallen far behind, so he immediately fell asleep under the tree. When the white rabbit wakes up, the turtle has just arrived in town B. The white rabbit continues to go to town B, and the turtle also looks back for the white rabbit. As a result, it took the turtle $\frac{1}{16}$ of the time to complete the journey before meeting the white rabbit again. Assuming that the white rabbit and the turtle move at a constant speed except when they are asleep, how many minutes did the white rabbit sleep?
(8 marks)

試卷完 END OF PAPER