

**第三屆全港小學數學挑戰賽(2016-2017)**  
**The 3<sup>rd</sup> Hong Kong Primary Mathematics Challenge (2016-2017)**

初賽 (二零一六年十二月三日)  
 Semi-Final (3<sup>rd</sup> December, 2016)

小六組	組別項目	試卷
Primary 6	Group 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、參賽者姓名及班級、參賽者編號、座位編號。  
 Write your name, class, 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. 除非問題特別聲明，分數的答案須化至最簡。  
 Unless otherwise stated by the question, answers of fraction should be expressed in their simplest form.
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：四十五分鐘  
Time allowed: 45 minutes

總分：400  
Total marks: 400

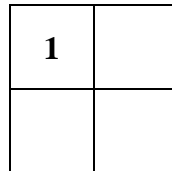
1. 計算  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{19 \times 20}$  的值。 (19 分)  
Find the value of  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \dots + \frac{1}{19 \times 20}$ . (19 marks)
2. 設  $N$  是一個 3 位數並有以下兩個性質：  
(i)  $N$  不可以被 2、3 或 5 整除，  
(ii)  $N$  的 3 個數字均不可以被 2、3 或 5 整除；  
求  $N$  有多少個？ (20 分)  
Consider a 3-digit number  $N$  with the following two properties:  
(i)  $N$  is not divisible by 2, 3 or 5.  
(ii) None of the 3 digits of  $N$  is divisible by 2, 3 or 5.  
How many  $N$  exist? (20 marks)
3. 若  $a \times b = 60$ ，其中  $a$  和  $b$  均為正整數，求所有  $a$  和  $b$  的可能值之和。 (21 分)  
If  $a \times b = 60$ , where  $a$  and  $b$  are positive integers, find the sum of all possible values of  $a$  and  $b$ . (21 marks)
4. 根據下圖，求  $G_{20}$  的第一個整數。 (22 分)  
According to the following figure, find the first integer in  $G_{20}$ . (22 marks)
- $G_1$  : 1  
 $G_2$  : 2, 3  
 $G_3$  : 4, 5, 6  
 $G_4$  : 7, 8, 9, 10  
⋮
5. 如果英文字 'PRIMARY' 的數字密碼是 '182011153201'，  
請寫出英文字 'SCHOOL' 的數字密碼。 (22 分)  
If the word 'PRIMARY' is represented by the code '182011153201'，  
write down the code of the word 'SCHOOL'. (22 marks)
6. 已知  $\frac{1}{a} - \frac{1}{b} = 3$ ，求  $\frac{4ab - 3a + 3b}{2b - 3ab - 2a}$  的值。 (23 分)  
Given that  $\frac{1}{a} - \frac{1}{b} = 3$ , find the value of  $\frac{4ab - 3a + 3b}{2b - 3ab - 2a}$ . (23 marks)
7. 若  $9m + 5n = 181$ ，而  $m$ 、 $n$  皆為質數，求  $m + n$  的值。 (23 分)  
If  $9m + 5n = 181$ , where  $m$  and  $n$  are prime numbers, find the value of  $m + n$ . (23 marks)
8. 請問有多少個正整數  $n$ ，使  $1 + 2 + \dots + n$  為  $7n$  的因數？ (24 分)  
How many positive integers  $n$  are there such that  $1 + 2 + \dots + n$  is a factor of  $7n$ ? (24 marks)

9. 下圖中的四格可填上數字 1 至 6，使得每一個數字不得小於上一格或左邊一格的數字(數字可以重複使用)。  
 左上角的格子已填上數字，問有多少種方法可填上數字？ (24 分)

The 4 squares in the diagram below can be filled with numbers 1 to 6 such that the number in a box cannot be smaller than the number in the box directly above or to the left of it (the numbers can be used repeatedly).

One of the squares has already been filled with number.

Find the number of ways to fill in the numbers. (24 marks)



10. 一班學生中， $\frac{1}{3}$ 的學生是有配戴眼鏡的男生，沒有配戴眼鏡的女生數目是沒有配戴眼鏡的男生數目的 3 倍，而班內男生人數是女生的 $\frac{7}{8}$ 。  
 若只有 4 位女生配戴眼鏡，求該班學生的總人數。 (24 分)

In a group of students,  $\frac{1}{3}$  of the students are boys wearing glasses. The number of girls without glasses is 3 times the number of boys without glasses. The number of boys is  $\frac{7}{8}$  of the number of girls.

If there are 4 girls wearing glasses, find the total number of the students. (24 marks)

11. 若甲、乙、丙三人合作修築一條公路，可於 90 天完成；若甲、乙、丁三人合作，則可於 120 天完成；若丙、丁二人合作，則可於 180 天完成。  
 現在甲、乙二人合作 36 天後，剩下的工程由甲、乙、丙、丁四人合作，還需要多少天才可完成？ (25 分)

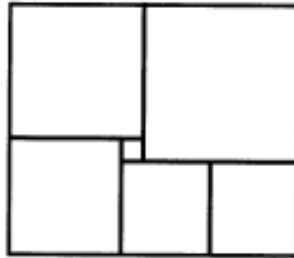
If A, B and C work together to construct a highway, the construction work can be done in 90 days. If A, B and D work together, it can be done in 120 days. If C and D work together, it can be done in 180 days.

Suppose A and B have spent 36 days in constructing the highway, and C and D join afterward. How many extra days should A, B, C and D take in order to finish the remaining construction work. (25 marks)

12. 購物中心有一扶手電梯以不變的速度於兩樓層間移動，此扶手電梯共有  $n$  級階級。李先生與陳先生在電梯上行走，李先生的速度是陳先生的兩倍。  
 假如李先生從下層至上層需走 27 級，同一時間陳先生便走了 18 級，求  $n$  的值。 (27 分)

An escalator of a shopping centre is moving in uniform speed between two floors. The escalator has  $n$  steps. Mr. Lee and Mr. Chan are using in the escalator, the speed of Mr. Lee is twice the speed of Mr. Chan. If Mr. Lee and Mr. Chan climb 27 steps and 18 steps to the upper floor respectively, find the value of  $n$ . (27 marks)

13. 設  $x_1, x_2, x_3, \dots, x_7$  為正整數,  $x_1 < x_2 < x_3 < \dots < x_7$   
 且  $x_1 + x_2 + x_3 + \dots + x_7 = 2000$ , 求  $x_1 + x_2 + x_3$  的最大值。 (29 分)  
 If  $x_1, x_2, x_3, \dots, x_7$  are positive integers,  $x_1 < x_2 < x_3 < \dots < x_7$  and  
 $x_1 + x_2 + x_3 + \dots + x_7 = 2000$ , find the greatest value of  $x_1 + x_2 + x_3$ . (29 marks)
14. 下圖是一個由 6 個正方形組成的長方形, 若最小的正方形面積為  $36 \text{ cm}^2$ ,  
 求該長方形的面積。 (31 分)  
 In the figure, there are 6 squares to form a rectangle. If the area of the smallest  
 square is  $36 \text{ cm}^2$ , find the area of the rectangle. (31 marks)



15.  $x, y, z$  是正整數而且  $\frac{168}{5} = x + \frac{1}{y + \frac{1}{1 + \frac{1}{z}}}$ 。  
 若  $A = xyz$ , 求  $A$  的值。 (32 分)  
 $x, y$  and  $z$  are positive integers and  $\frac{168}{5} = x + \frac{1}{y + \frac{1}{1 + \frac{1}{z}}}$ .  
 If  $A = xyz$ , find the value of  $A$ . (32 marks)
16. 根據圖中的規律, 求  $a, b, c, d$  的值。 (34 分)  
 According to the pattern in the figure, find the values of  $a, b, c$  and  $d$ . (34 marks)

59	46	3	2	81	70
$d$	19	80	37	$a$	45
40	5	12	69	73	8
18	7	56	40	2	93
67	38	49	1	50	2
$c$	20	7	85	$b$	61

試卷完 END OF PAPER