亞 洲 國 際 數 學 奧 林 匹 克 聯 合 會
ASIA INTERNATIONAL MATHEMATICAL OLYMPIAD UNION

亞洲國際數學奧林匹克公開賽初賽
Asia International Mathematical Olympiad Open Trials

小五組 Grade 5

時限：70 分鐘

Time allowed: 70 minutes

試題
Question Paper

本試題不可取走。
THIS QUESTION PAPER CANNOT BE TAKEN AWAY.

未得監考官同意，切勿翻閱試題，否則參賽者將有可能被取消資格。
DO NOT turn over this Question Paper without approval of the examiner.
Otherwise, contestant may be DISQUALIFIED.

Section A – each question carries 4 marks

1) Find the value of $3 + 6 + 9 + \cdots + 24 + 27 + 30 + 27 + 24 + \ldots + 9 + 6 + 3$.

2) Find the smallest positive 2-digit factor of 2491.

3) Find the value of the expression below.

$$\frac{1}{\left(\dfrac{3}{\left(\dfrac{5}{8}\right)}\right)} \times 24$$

4) Find the unit digit of $1\times2\times3\times11\times12\times13\times21\times22\times23\times31\times32\times33\times\ldots\times212$.

5) When a 3-digit number has a remainder of 2 when it is divided by either 4, 7 or 11. Find the largest possible value of the number.

6) Leo, David, Flora and Clark stand in a row for photo. If Flora and Clark must stand next to each other, how many different ways are there to take the photo?

7) How many rectangles are there in the figure below contains exactly 2 black dots?
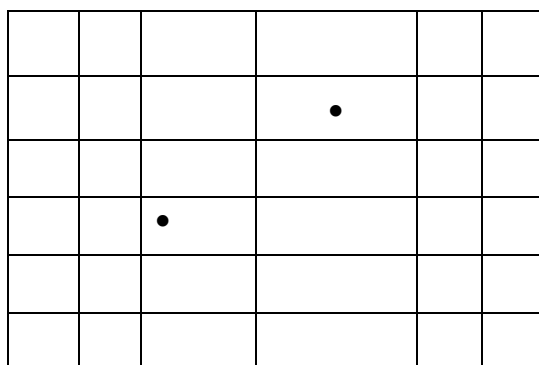
8) In the figure below, the area of ΔBXC is 2016cm^2 and the length of both AD and BC are respectively 200cm and 300cm. Find the area of the trapezium $ABCD$.
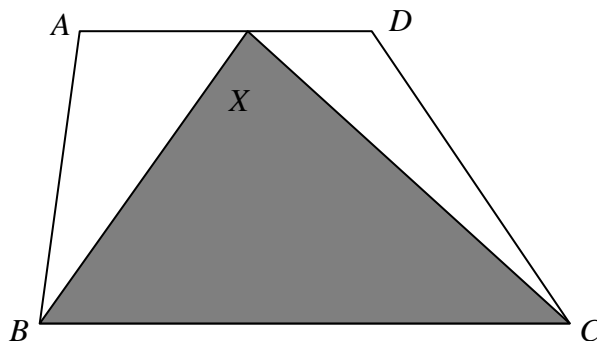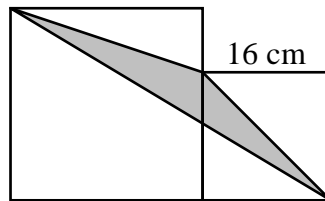

~ End of section A ~

Section B – each question carries 5 marks

9) Among integers from 1 to 2016 (1 and 2016 inclusive), how many numbers are there cannot be divided by neither 7 nor 13?

10) Flora and Clark start swimming at the same time from the same side of a rectangular swimming pool. When they touches the edge of the other end of the swimming pool, they immediately swim back in the opposite direction. The speed of Flora is 3m/sec and that of Clark is 2m/s. It is also known that the length of the pool is 90m. What is the distance between their starting point and the point they first met?

11) Clark repeatedly wrote '83427' 60 times to form a 300-digit number. Find the remainder when the 300-digit number is divided by 6.

12) How many different 3-digit number can be formed by using 0, 1, 2, 6 and 7 without repeating any digits?

13) Find the value of $100^2 - 95^2 + 90^2 - 85^2 + \ldots + 10^2 - 5^2$.

14) A plane is flying at a speed of 15km per hour to a destination. The plane has to reduce its speed on its return journey due to weather issues. If the average speed of the round flight is 12km per hour, find the speed of the plane on the return journey.

All answers should be written on the ANSWER SHEET.

15) Find the remainder when $1+2+3+\ldots+2015+2016$ is divided by 16.

16) The figure below is formed by 2 squares. Find the area of the shaded region (in cm^2).

16 cm

~ End of section B ~

Section C – each question carries 7 marks

17) Flora and Clark starts a journey at the same time from City A to City B. The speed of Flora is 8km faster than that of Clark per hour. Three hours later, Flora reaches City B and starts to return to City A. Flora meets Clark at 16km from City B. What is the distance between the two cities?

18) Find the value of A in the equation below.

$$2+\cfrac{1}{2+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{A}}}}}=\frac{88}{37}$$

19) Clark and Flora has certain number of peanuts in the ratio of 3: 4. Then Flora gave 20 peanuts to Clark and the ratio between Clark and Flora becomes 7：6. How many peanuts does Clark have at the beginning?

20) There are a total of 100 coins, which are either $1, $2 or $5. The value of the 100 coins is $216.
If the total value of the $2 coins worth $17 more than that of the $1 coins, find the number of $5 coins.

~ End of Paper ~