数学花园
探秘
MATHEMATICS GARDEN

2025 Spring Cup
Mathematical Olympiad

Date: 7 February 2025

Time Given: 1 hour

Level: Primary 2 & 3

Name: _____

Instruction to Candidates

1. Do not open the booklet until you are told to do so.
2. Answer ALL 20 questions.
3. Write your answers in the answer sheet provided.
4. No steps are needed to justify your answers.
5. Questions 1-7 are worth 4 marks each.
6. Questions 8-14 are worth 6 marks each.
7. Questions 15-19 are worth 8 marks each.
8. Questions 20 is worth 10 marks.
9. No marks will be deducted for wrong answers.
10. No marks will be given for unanswered questions.
11. No calculators or mathematical instruments are allowed.

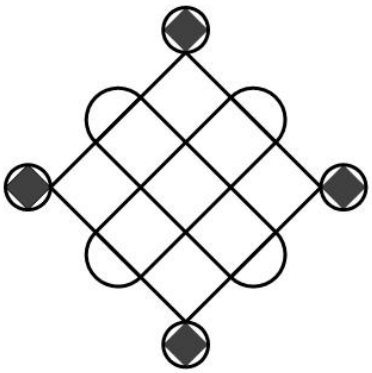
Questions 1 to 7 are worth 4 marks each.

1. $2-0\times2+5=$ _____.

2. SCMO started in 1984. In the following calculations, the same shape represents the same number. Find the value of the rectangle.

$$\square+\square+\square+\square+\square=1984$$
$$\square+\square+\square+\square+\square+\square=2025$$

3. Alex used an AI application to draw a special "Chinese knot". This figure is formed by squares, rectangles and circles only. How many squares are there in this picture?

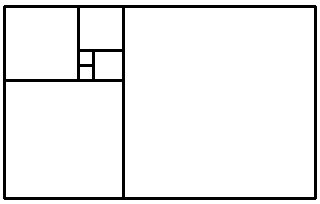


4. There are two types of camels: one-humped camels with only one hump on their back and two-humped camels with two humps on their back. There is a group of camels with 23 humps and 60 legs. How many one-humped camels are there in this group?

5. Each of the four people said a sentence:
Alex said, "The number of times 0 appears in what we said is A."
Ben said, "The number of times 1 appears in what we said is B."
Cindy said, "The number of times 2 appears in what we said is C."
Deft said, "The number of times 4 appears in what we said is D."
Now replace A, B, C, and D (A, B, C, D can be the same) with numbers from 0 to 9, so that what they are saying is true. What is the value of B?

6. The average of 5 numbers is 88. After changing one of the numbers to 10, the average becomes 66. What was the original number that was changed?

7. In the figure on the right, 7 small squares are pieced together to form a large rectangle. If the side lengths of these 7 small squares are 1, 1, 2, 3, 5, 8, and 13 in ascending order, what is the perimeter of this large rectangle?



Questions 8 to 14 are worth 6 marks each.

8. A palindrome number is a number that is the same when read in reverse. For example, 88, 123321, 26562. Some people have found that it seems that any natural number, by adding itself to its reverse order, and then adding the resulting sum to its reverse order, will eventually yield a palindrome number. For example, 12+21=33, and the number 12 only requires one step to obtain the palindrome. For example, the number 265:

265+562=827

827+728=1555

1555+5551=7106

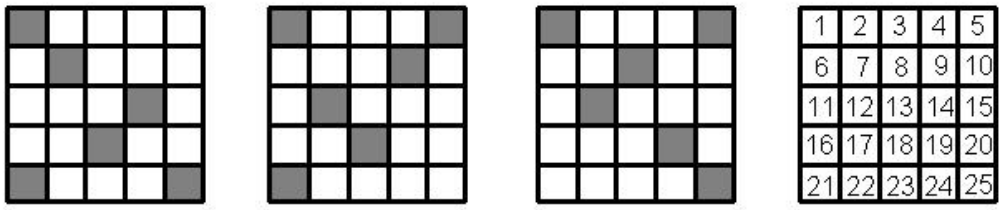
7106+6017=13123

13123+32131=45254

It takes five steps to obtain a palindrome.

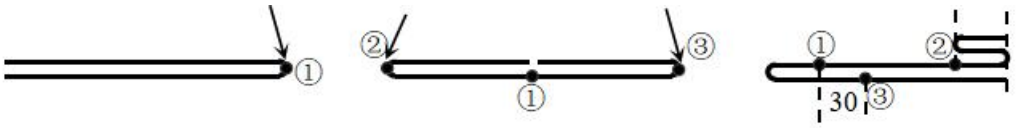
How many steps are needed to obtain the first palindrome number from 96.

9. According to the pattern of the first three images, mark the corresponding square in the fourth image black. What is the sum of the numbers filled in the black square?



10. There are 50 pieces of chocolate, and Alex and Ben played a game. Alex takes 5 pieces of chocolate every time he wins, eats 4 pieces, and puts the remaining 1 piece in his pocket; Ben takes 5 pieces of chocolate every time he wins, eats 3 pieces, and puts the remaining 2 pieces in his pocket. At the end of the game, the chocolate is just finished, and the number of chocolates in Ben's pocket is exactly three times that of Alex's. So, how many chocolates did the two of them eat in total?

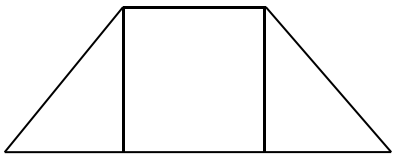
11. There is a rope, fold it in half for the first time using the method shown in the left picture, and mark ① at the fold point; For the second time, we folded it according to the method shown in the middle picture, and marked ② and ③ at the folding points respectively; For the third time, we will fold it in the same way as shown in the picture on the right. If the distance between point ① and point ③ in the image on the right is 30 centimeters, what is the total length of this rope in centimeters? (There is no gap between the ropes, and the rope thickness and loss at the turning point are ignored.)



12. The same letter represents the same number, while different letters represent different numbers. What is largest value of the four-digit number $\overline{DEFG}$?

$$\begin{array}{cccc} & A & B & C \\ + & D & E & F & G \\ \hline & 2 & 0 & 2 & 5 \end{array}$$

13. The perimeter is the total length outside the shape. The following figure consists of two identical triangles and a square. The perimeter of a triangle is 20cm. What is the perimeter of this whole shape?



14. Four people took an exam. The sum of the scores of the first two places was 17 points higher than the sum of the scores of the last two places. The first place was 4 points higher than the second place, and the third place was 5 points higher than the fourth place. How many points was the first place higher than the fourth place?

Questions 15 to 19 are worth 8 marks each.

15. 2025 students are arranged in a row from front to back and are required to write numbers according to the following rule: If a student writes a 1-digit number, the next student must write the sum of that number and 8; If a student writes a 2-digit number, the next student need to write the sum of the number's ones digit and 7. For example, **if** the first student wrote 4, the second student should write 12, and the third student should write 9.
Now if the first student writes 1, what is the number written by the last student?

16. A and B stand facing each other 30 meters apart. They play "Rock, Paper, Scissors". The winner walks 3 meters forward and the loser walks 2 meters backward. If it is a tie, each person walks 1 meter forward. After playing 15 games, A is 17 meters away from his starting point and B is 2 meters away from his starting point. How many games did A win?

17. Alex is playing at a special amusement park with 10 different games numbered 1-10, each of which requires a corresponding number of coins to be spent. He can earn 1 coin for each game he plays and cannot play the same game again. For example, if he wants to play the 7th game, he needs to spend 7 coins and can receive 1 coin after finishing, but he cannot play the 7th game again. He initially had 31 coins. If we add up all the numbers of the games he played, for example, if he played the third and ninth games, the sum is 9+3=12. What is the maximum sum?

18. At the Spring Games, Knight, Greg, Chief, Flippy, and Peter ran a 400-meter race. After the race, they discussed the results:
The first place said, "Knight runs faster than Chief."
The second place said, "I run faster than Flippy."
The third place said, "I run faster than Peter."
The fourth place said, "Knight runs faster than Greg."
The fifth place said, "Flippy runs faster than Peter."
If only Peter told a lie, what place is Knight?

19. Alex was looking at an incorrect one-digit multiplication formula $A \times B = \overline{CD}$ (where A, B, C, and D represent different digits), and Alex discovered that if he changed only one of the digits, there are 3 different ways to make the multiplication correct; If we only change the order of A, B, C, and D, he can also correct the multiplication.
What is the sum of these four letters?

Questions 20 is worth 10 marks.

20. In your opinion, from question 1 to 19, your favourite question is question _____, the most difficult question is question _____.
(As long as your answer is within 1 to 19, you get full marks, otherwise you get zero.)