注意：

允許學生個人、非營利性的圖書館或公立學校合理使用 IMC 各項試題及其解答。**可直接下載而不須申請**。

重版、系統地複製或大量重製本資料的任何部分，必須獲得 IMC 行政委員會的授權許可。

申請此項授權請電郵 IMC 行政委員會主席孫文先

ccmp@seed.net.tw

Notice:

Individual students, nonprofit libraries, or schools are permitted to make fair use of the papers and its solutions. Republication, systematic copying, or multiple reproduction of any part of this material is permitted only under license from the IMC Executive Board. Requests for such permission should be made by e-mailing Mr. Wen-Hsien SUN ccmp@seed.net.tw

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

Time：60 minutes

Instructions:

- Do not turn to the first page until you are told to do so.
- Remember to write down your team name in the space indicated on every page.
- There are 10 problems in the Team Contest, arranged in increasing order of difficulty. Each question is printed on a separate sheet of paper. Each problem is worth 40 points. For Problems 1, 3, 5, 7 and 9, only answers are required. Partial credits will not be given. For Problems 2, 4, 6, 8 and 10, full solutions are required. Partial credits may be given.
- The four team members are allowed 10 minutes to discuss and distribute the first 8 problems among themselves. Each student must attempt at least one problem. Each will then have 35 minutes to write the solutions of their allotted problem independently with no further discussion or exchange of problems. The four team members are allowed 25 minutes to solve the last 2 problems together.
- No calculator or calculating device or electronic devices are allowed.
- Answer must be in pencil or in blue or black ball point pen.
- All papers shall be collected at the end of this test.

English Version

For Juries Use Only

No.	1	2	3	4	5	6	7	8	9	10	Total	Sign by Jury
Score												
Score												

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

1. Choose nine different ones of 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10. Use each of them exactly once to form three equations, using each of addition, subtraction, multiplication and division at most once. What is the smallest number that we can leave out?

Answer: _____

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

2. The squares of a 3 by 3 table are labelled 1, 2, …, 9 as shown. In how many ways can we shade five of the squares so that no row or column is completely shaded?

1	2	3
4	5	6
7	8	9

Answer: _____ ways

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

3. The diagram shows an 8 by 8 board. An ant visits each of the 64 squares once and only once. It crawls from one to another of two squares sharing at least one corner. The order in which the squares are visited is marked with numbers, starting from 1 and ending at 64. Some of the marked numbers have been erased. Restore these erased numbers.

	5				26	25	
		10	29			23	
2				31		37	
1	12		19	21		38	34
13			17	49		33	
59		16		50	47	40	
		64			46		42
		55		53	52	45	43

Answer:

	5				26	25	
		10	29			23	
2				31		37	
1	12		19	21		38	34
13			17	49		33	
59		16		50	47	40	
		64			46		42
		55		53	52	45	43

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

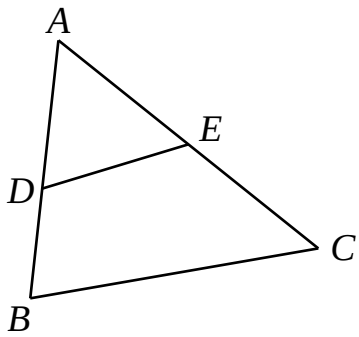
Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

4. In triangle ABC, $AB = 7$ cm and $AC = 9$ cm. D is a point on AB such that $BD = 3$ cm. E is a point on AC such that the area of the quadrilateral $BCED$ is $\frac{5}{7}$ of the area of triangle ABC. Find the length, in cm, of CE.



Answer: _____ cm

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

5. How many positive integers less than 100 are there such that the product of all positive divisors of such a number is equal to the square of the number?

Answer: _____

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

6. A hat is put on the head of each of 33 children. Each hat is red, white or blue. Each can see the hats of all other children except his or her own. Willem sees three times as many red hats as blue hats. Maxima sees twice as many white hats as blue hats. What is the colour of Maxima's hat?

Answer: _____

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

7. Mary has a three-digit number. The first two digits are the same but different from the third digit. Myra has a one-digit number. It is the same as the last digit of Mary's number. How many different four-digit numbers can be the product of Mary's and Myra's numbers?

Answer: _____

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

8. A 4 m by 4 m window on a wall is to be boarded up with eight identical 1 m by 2 m or 2 m by 1m wooden planks. In how many different ways can this be done? Two ways resulting in the same final diagram are not considered different.

Answer: _____

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

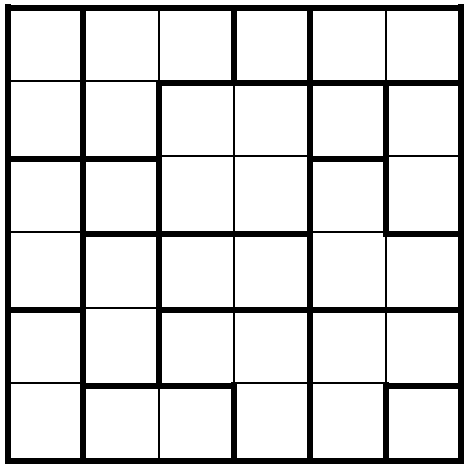
TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

9. The 6 by 6 table in the diagram below is divided into 17 regions, each containing a number. Each of the 36 squares contains one of the numbers 1, 2, 3, 4, 5 and 6. All six numbers appear in every row and every column. The number in a white region is the number in the only square of the region. The number in a yellow region is the difference when the number in one of the squares is subtracted from the number in the other square. The number in a green region is the quotient when the number in one of the squares is divided by the number in the other square. The number in a red region is the sum of the numbers in all the squares of the region. The number in a blue region is the product of the numbers in all the squares of the region. Fill in the 36 numbers.

3	24		5	5	
		60		3	12
1	1			150	
	24	3			
4		10		7	
	11				2



Answer: _____

International Mathematics Competition (TIMC 2016)

Chiang Mai, Thailand 14 - 20 August 2016

Elementary Mathematics International Contest

TEAM CONTEST

17th August, 2016, Chiang Mai, Thailand

Team : _____ Score : _____

10. A polygon is said to be *convex* if each of its interior angles is less than $180°$. What is the maximum number of sides of a convex polygon which can be dissected into squares and equilateral triangles of equal side lengths? Justify your answer.

Answer: _____