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*Indonesia International
Mathematics Competition 2022
(Virtual)*

Indonesia, 30th June to 6th July 2022

Elementary Mathematics International Contest
Individual Contest

Time limit: 90 minutes

Information:

- You are allowed 90 minutes for this paper, consisting of 15 questions to which only numerical answers are required.
- Each question is worth 10 points. No partial credits are given. There are no penalties for incorrect answers, but you must not give more than the number of answers being asked for. For questions asking for several answers, full credit will only be given if all correct answers are found.
- Diagrams shown may not be drawn to scale.

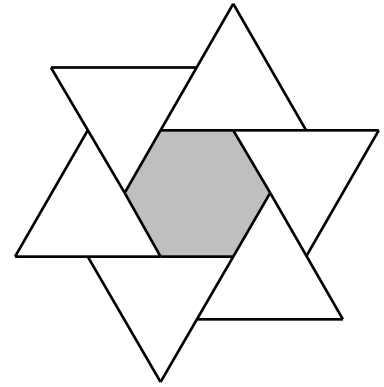
Instructions:

- Write down your name, your contestant ID and your team's name on the answer sheet.
- Enter your answers in the space provided on the answer sheet.
- You must use either a HB, B or 2B pencil or a ball-point pen which is either black or blue.
- You may not use instruments such as protractors, calculators and electronic devices.
- At the end of the contest, you must hand in the envelope containing the question paper, your answer sheet and all scratch papers.

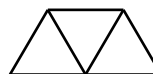
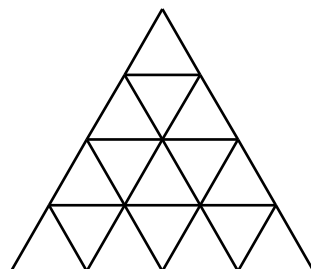
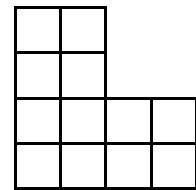
English Version

Team: _____ *Name:* _____ *ID.:* _____

1. The diagram on the right is composed of six identical equilateral triangles and one regular hexagon, where the ratio of the side length of the equilateral triangle to the side length of the regular hexagon is 2 : 1. If the area of the whole diagram is 45 cm^2 , then what is the area, in cm^2 , of the regular hexagon?



2. At a stationery store, the unit cost, in dollars, of one notebook is an integer. The cost of buying nine identical notebooks is more than 1100 but less than 1200 dollars, while the cost of buying thirteen identical notebooks is more than 1500 but less than 1600 dollars. What is the cost, in dollars, of one notebook?
3. The average score obtained by a class of 100 students in an exam is 79. If the average score obtained by all the girls in the class is 75, while the average score obtained by all the boys is the same as the number of boys in the class, then what is the total number of girls in the class?
4. The diagram shows an “L-shaped” figure which is made up by 1×1 unit squares. Kitty cuts the figure along the grid lines to make two pieces. She then uses these pieces to form a 2×6 rectangle, where the pieces are allowed to be rotated or flipped. What is the minimum positive difference between the areas, in unit squares, of the two pieces?
5. There are eight big volcanoes and six small volcanoes in Indonesia. Big volcanoes erupt every three years and small volcanoes erupt every two years. If there were 30 eruptions in the last five years, then how many volcanoes will erupt this year?
6. The diagram below on the left is made by five copies of the token on the right and one unit triangle:



In how many positions can we place the unit triangle on the board such that the rest of the board can be fully covered by the remaining 5 tokens?
(Note: the tokens can be rotated or flipped).

7. In a Mathematics contest, the scores of 10 students, which are all positive integers, are shown in the table below, except for Grace's score.

Alice	Bob	Carla	David	Eric	Freya	Grace	Helen	Ivory	Jordan
23	6	14	13	23	9	?	12	29	19

The committee remembers that the difference between the average of the six highest scores and the average of the six lowest scores is 12. What is the sum of all the possible scores of Grace?

8. In the following 3×3 board, some cells are already filled in with positive integers:

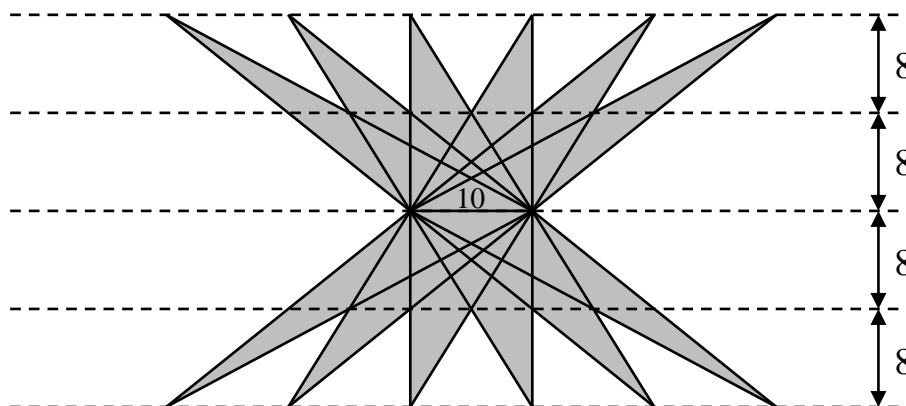
1	8	
		10
4		

Our goal is to write a positive integer in each of the remaining empty cells in such a way that the following conditions are met:

- All nine integers written on the board must be different from each other.
- The sum of the four integers in any 2×2 square is always the same.

Find the smallest possible value for the sum of the nine integers on the board.

9. There are five parallel horizontal dashed lines and the distance between two adjacent dashed lines is 8 cm, as shown on the diagram below. If the length of the segment on the middle dashed line is 10 cm, what is the area, in cm^2 , of the shaded region?



10. Let $A = \frac{2021^{2022} + 2022^{2023} + 2023^{2024}}{2021^{2021} + 2022^{2022} + 2023^{2023}}$. What is the largest integer that does not exceed A ?

11. Captain Crook and five members of his team are seated at a round table, sharing 99 coins. If at least three members of the five team members have more coins than each of his two neighbors, then what is the maximum number of coins that Captain Crook can have?

