

7th International Mathematics Assessments for Schools (2017-2018)

Middle Primary Division Round 2

Time: 120 minutes

Printed Name: _____

ID: _____

Instructions:

- Do not open the contest booklet until you are told to do so.
- Be sure that your name and code are written on the space provided above.
- Round 2 of IMAS is composed of three parts; the total score is 100 marks.
- Questions 1 to 5 are given as a multiple-choice test. Each question has five possible options marked as A, B, C, D and E. Only one of these options is correct. After making your choice, fill in the appropriate letter in the space provided. Each correct answer is worth 4 marks. There is no penalty for an incorrect answer.
- Questions 6 to 13 are a short answer test. Only Arabic numerals are accepted; using other written text will not be honored or credited. Some questions have more than one answer, as such all answers are required to be written down in the space provided to obtain full marks. Each correct answer is worth 5 marks. There is no penalty for incorrect answers.
- Questions 14 and 15 require a detailed solution or process in which 20 marks are to be awarded to a completely written solution. Partial marks may be given to an incomplete presentation. There is no penalty for an incorrect answer.
- Use of electronic computing devices is not allowed.
- Only pencil, blue or black ball-pens may be used to write your solution or answer.
- Diagrams are not drawn to scale. They are intended as aids only.
- After the contest the invigilator will collect the contest paper.

**The following area is to be filled in by the judges;
the contestants are not supposed to mark anything here.**

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total Score	Signature
Score																	
Score																	

Final Score:

Middle Primary Division Round 2

Questions 1 to 5, 4 marks each

1. Arrange 30 triangles in a row and color them black and white in a pattern as shown below. How many more black triangles than white triangles are there?



- (A) 8 (B) 10 (C) 12 (D) 14 (E) 15

Answer : _____

-
2. It is known that $A \times B \times C = 30$, $B \times C \times D = 90$ and $C \times D \times E = 120$, what is the value of $A \times C \times E$?

- (A) 20 (B) 30 (C) 40 (D) 50 (E) 60

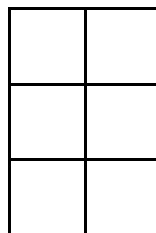
Answer : _____

-
3. Replace each Δ by "+" or "-" in the expression $1\Delta 2\Delta 3\Delta 8\Delta 15$ and compute the value of the expression. How many different positive integers can we have for the expression?

- (A) 8 (B) 10 (C) 12 (D) 14 (E) 16

Answer : _____

-
4. A rectangle is divided into 6 identical squares as shown in the figure below. Color four squares black such that each row has at least one black square. Two color methods are considered the same if they are identical after rotation. How many different color methods are there?



- (A) 4 (B) 5 (C) 6 (D) 7 (E) 10

Answer : _____

MP 2

5. Two cars start moving from opposite ends of a road towards each other at a constant speed. The faster car travels at 40 km per hour. After two hours, the faster car is 20 km past the midpoint and 6 km away before meeting the slower car. What is the speed of the slower car in km per hour?

(A) 17 (B) 19 (C) 21 (D) 23 (E) 25

Answer : _____

Questions 6 to 13, 5 marks each

6. Select three different numbers from 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 such that their average is 5. How many different possible combinations are there?

Answer : _____ combinations

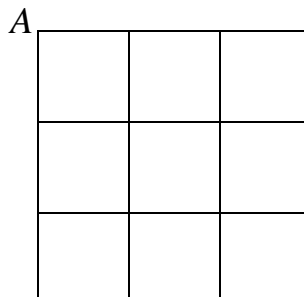
7. The pages of a book begin from No. 1, 2, 3, ... such that two consecutive numbers appear on both sides of a single page. When one page is torn, the sum of the remaining page numbers is 1133. What is the sum of those two numbers on the torn page?

Answer : _____

8. The number of boys in a class is twice as the number of girls. In a math test, the average score of the class is 86, but average score of the girls is 90. What is the average score of the boys?

Answer : _____

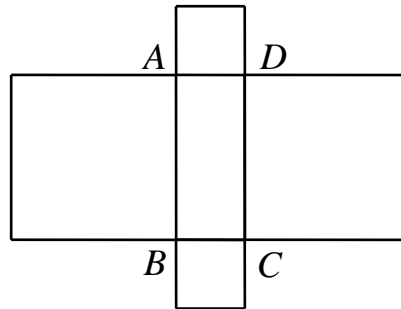
9. The road map of a certain city consists of 3×3 squares with each of the smaller squares having a side length of 20 meters as shown in the figure. A street sweeper starts cleaning from point A and every road thereafter until finally returning to A. What is the shortest distance, in meters, in which he can do the task?



Answer : _____ meters

MP 3

10. The perimeter of rectangle $ABCD$ is 34 cm. Draw four squares extending outward from its four sides, as shown in the figure below. If the sum of the areas of the four new squares is 338 cm^2 , what is the area, in cm^2 , of rectangle $ABCD$?



Answer : _____ cm^2

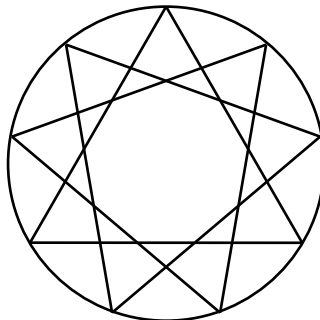
11. Millie has 60 red beads, 50 black beads and a magic machine. Each time 4 red beads are inserted into the machine, it gives out 1 black bead and for every 5 black beads is inserted, the machine gives out 2 red beads. After having operated the machine 30 times, Millie has no more red beads. Find the number of black beads she has now.

Answer : _____ black beads

12. A 3-digit number \overline{abc} is said to be a lucky number if $a \times b \times c$ is also a three-digit number. What is the least possible lucky number \overline{abc} ?

Answer : _____

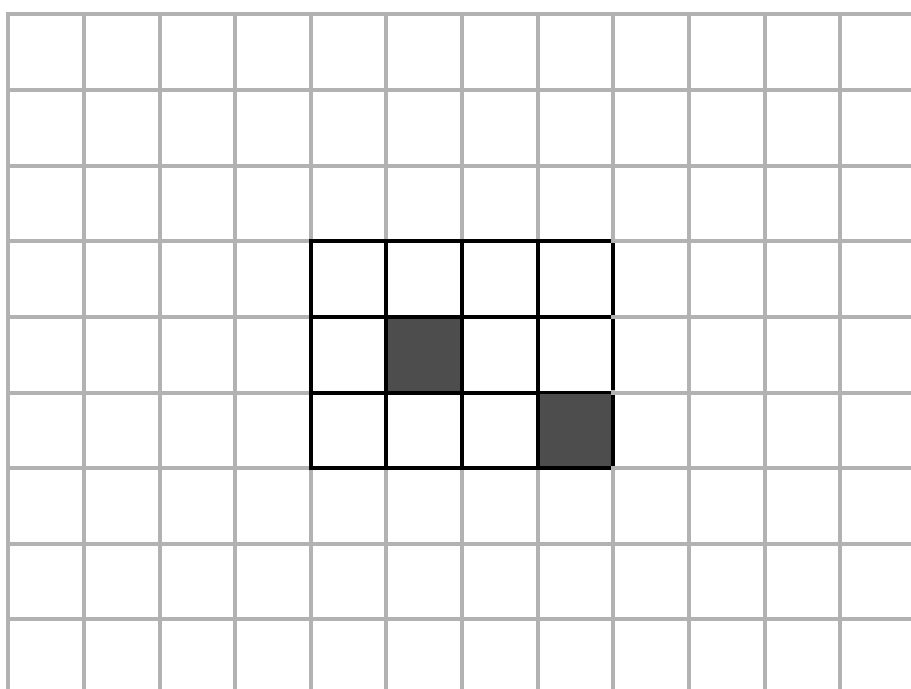
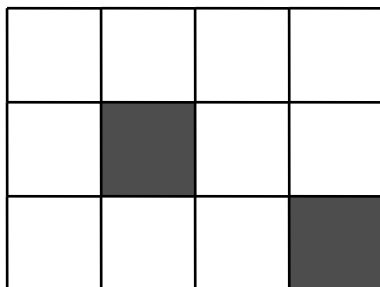
13. Rotate an equilateral triangle inscribed in a circle 40 degrees clockwise and counter-clockwise, as in the figure below. How many triangles are there in the figure?



Answer : _____ triangles

Questions 14 to 15, 20 marks each
(Detailed solutions are needed for these two problems)

14. A rectangle is divided into 12 unit squares such that 10 are white and 2 are black, as shown in the figure below. To form a centrally symmetric picture by adding some white squares but no black squares, what is the least number of white squares needed? Please draw the centrally symmetric picture.



Answer : _____ white squares,

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MP 5

15. There are 12 different positive integers which satisfy the condition that the product of every 5 numbers is even and that the sum of all 12 numbers is odd. Find the least possible sum of these 12 positive integers.

Answer : _____
