

*8th International Mathematics Assessments for Schools
(2018-2019)*

Middle Primary Division Round 2

Time: 120 minutes

Printed Name: _____ *Code:* _____ *Score:* _____

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.**

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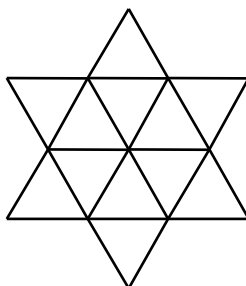
Middle Primary Division Round 2

Questions 1 to 5, 4 marks each

1. What is the value of $100 - 97 + 94 - 91 + 88 - 85 + \dots + 4 - 1$?
(A) 45 (B) 48 (C) 51 (D) 54 (E) 57

Answer : _____

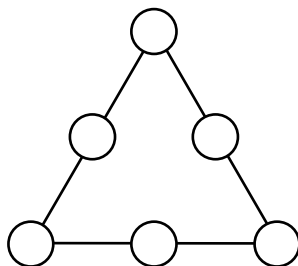
2. The figure below is formed by using 12 identical equilateral triangles. How many equilateral triangles of different sizes (and which are located in different places) are there?



- (A) 12 (B) 14 (C) 16 (D) 18 (E) 20

Answer : _____

3. Place the numbers 1, 2, 3, 4, 5 and 6, without repetition, into the six circles in the figure below, where each circle should only have one number, such that the sum of the three numbers on each side of the triangle are all equal. What is the maximum possible value of this sum?



- (A) 9 (B) 10 (C) 11 (D) 12 (E) 13

Answer : _____

4. Multiply a two-digit number by 3 then add 10 to it. Now, we swap the order of the two digits of the result. The resulting number is an integer among 95, 96, 97, 98 and 99. What is the original number?

- (A) 21 (B) 22 (C) 23 (D) 24 (E) 25

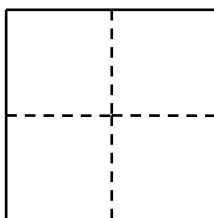
Answer : _____

5. If the month of January of a certain year has four Saturdays and five Sundays, then what day is January 17th of that particular year?
- (A) Monday (B) Tuesday (C) Wednesday
(D) Thursday (E) Friday

Answer : _____

Questions 6 to 13, 5 marks each

6. A square has a perimeter 48 cm. Cut it into four identical small squares along the dashed lines as shown below. What is the sum of the perimeters of the four smaller squares?

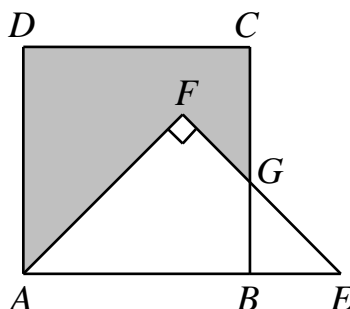


Answer : _____ cm

7. Lily went shopping and bought three items from three different stores. She then noticed that whenever she was paying for an item, the money in her pocket was exactly five times the amount to be paid. After shopping, she noticed that she has \$64 left in her pocket. How much money did she have before she went shopping?

Answer : _____ dollars

8. In the figure below, $ABCD$ is a square with side length of 10 cm and AFE is an isosceles right triangle with hypotenuse of length 14 cm, where E is on the extension of line AB . What is the area, in cm^2 , of the shaded region?



Answer : _____ cm^2

MP 3

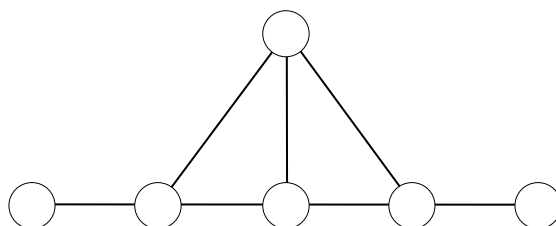
9. There are a total of 40 students in a class. 23 of them are able to ride bikes, 33 of them are able to swim and 5 of them are unable to do either. How many students in this class are able to ride bikes but are not able to swim?

Answer : _____ students

10. A bridge is 1500 m long. A train passes through the bridge at a speed of 30 m per second. The train is 300 m long. How long, in seconds, does it take for the train to pass the bridge completely, starting from the time it entered the bridge?

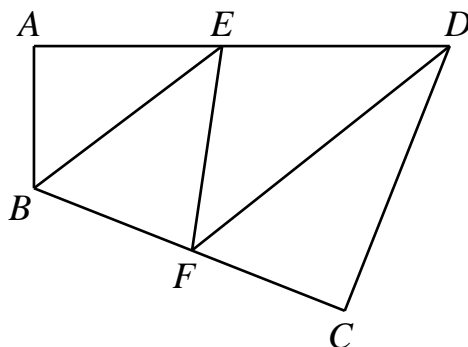
Answer : _____ seconds

11. In the figure below, color each of the six circles into 4 colors: Red, Yellow, Blue and Black. Each circle should contain only one color, and any two circles connected by a line segment should have different colors. In how many different ways can we color the figure below? (Note: Coloring methods that are identical by a reflection of the figure are NOT considered the same)



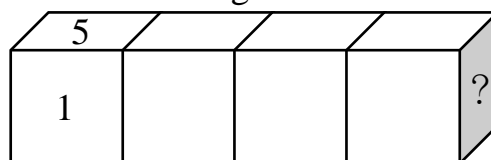
Answer : _____ ways

12. In quadrilateral $ABCD$, $\angle BAD = \angle BCD = 90^\circ$. Points E and F are on sides AD and BC respectively and $AB = 5$ cm, $CD = 10$ cm, $DE = 8$ cm, $BF = 6$ cm, as shown in the figure below. If the area of triangle BEF is 4 cm^2 less than the area of triangle DEF . What is the area, in cm^2 , of triangle DEF ?



Answer : _____ cm^2

13. The numbers 1, 2, 3, 4, 5 and 6 are written on the six faces of a unit cube without repetition. Each face contains one number and the sum of the numbers in every two opposite faces is 7. Put four such cubes side by side as shown in the figure below, such that sum of every two numbers of every two touched faces is 8. Find the number marked with “?” in the figure.



Answer : _____

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

14. A mouse starts from the top left-most unit square marked with “*I*”, follows a route to form the word “*IMAS2019*” by moving from one square to another square that share a common side. How many different routes of eight squares are there?

<i>I</i>	<i>M</i>	<i>A</i>	<i>S</i>	
<i>M</i>	<i>A</i>	<i>S</i>	2	0
<i>A</i>	<i>S</i>	2	0	1
<i>S</i>	2	0	1	9
	0	1	9	

Answer : _____ routes

15. An infinite sequence of numbers 1, 2, 3, 5, 8, 3, 1, 4, 5, 9, 4, ... follows the pattern such that starting from the third number, each number is equal to the units digit of the sum of the two numbers in the sequence immediately preceding it. What is the 2019th number of the sequence?

Answer : _____
