4th International Mathematics Assessments for Schools (2014-2015)

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.

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

Middle Primary Division Round 2

Questions 1 to 5, 4 marks each

1. What is the sum of the digits of the value of $100\times100-2015$?
（A）27　　（B）29　　（C）30　　（D）34　　（E）39

Answer: _____

2. If $6\otimes2=6+66=72$ and $2\otimes3=2+22+222=246$, what is the value of $5\otimes3$?
（A）3735　　（B）605　　（C）615　　（D）625　　（E）37035

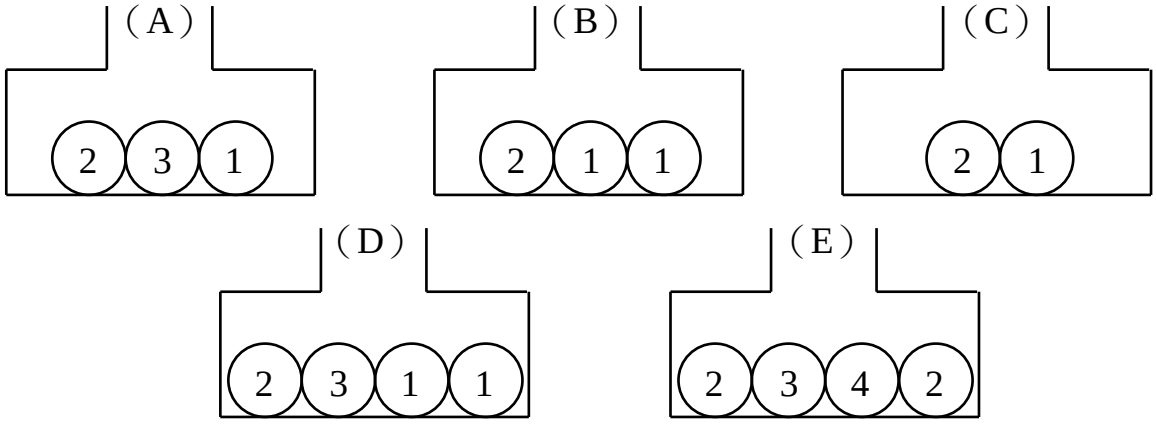
Answer: _____

3. In a gymnastic competition, an athlete receives a score from each of seven judges. After the highest score and the lowest score have been removed, the average of the remaining five scores is the actual score for that athlete. If the seven judges give scores of 9.2, 9.5, 9.3, 9.6, 9.1, 9.6 and 9.4 to an athlete, what is the actual score for this athlete?

（A）9.3　　（B）9.38　　（C）9.4　　（D）9.42　　（E）9.5

Answer: _____

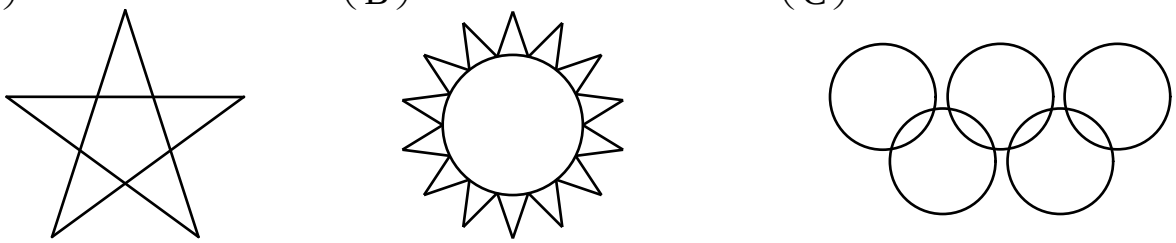
4. In a shopping mall, a ball is drawn from one of the five boxes shown below. A door prize is won if the number of the ball is 1. From which box should a ball be drawn so that the chance of winning a door prize is as large as possible?



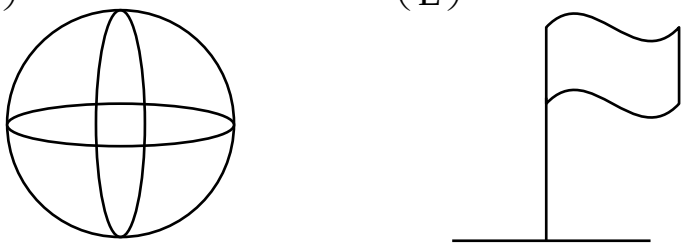
Answer: _____

5. Which of the following five figures is not possible to trace without lifting the pencil from the paper or retracing any part of it?

(A) (B) (C)



(D) (E)



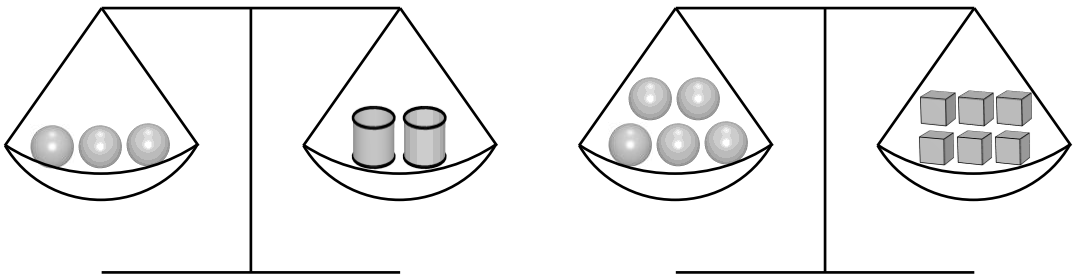
Answer: _____

Questions 6 to 13, 5 marks each

6. At the bookstore, Lily spends half of her money buying mathematics books and two-thirds of the remaining amount on Chinese literature books. She has just enough money left to buy an English literature book which costs $18. How much money does Lily have initially?

Answer: $_____

7. There are three kinds of objects, spheres, cylinders and cubes. Three spheres have the same total weight as two cylinders, and five spheres have the same total weight as six cubes. How many cubes will have the same total weight as five cylinders?



Answer: _____ cubes

8. In a video game, 1 point is awarded for eating the first apple, 2 points for eating the second apple, and so on, with 1 additional point awarded for the next apple eaten. What is the total number of points awarded for eating ten apples?

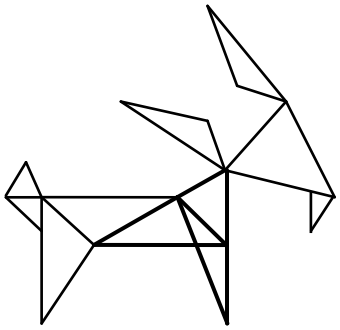
Answer: points

9. In the month of May of a certain year, there are five Sundays and four Mondays. On which day of the week does May 1 fall in that year?

(Using 0 to represent Sunday, 1 to represent Monday, 2 to represent Tuesday, 3 to represent Wednesday, 4 to represent Thursday, 5 to represent Friday, 6 to represent Saturday.)

Answer: _____

10. In the following diagram, how many different triangles are there, including overlapping triangles?



Answer: _____ triangles

MP 4

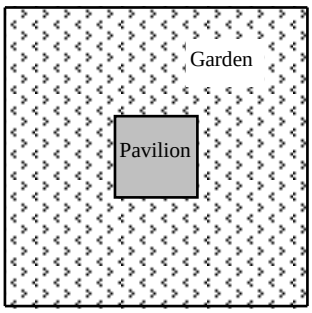
11. There are 20 children at a party. The first girl shakes hands with 7 boys. The second girl shakes hands with 8 boys. The third girl shakes hands with 9 boys, and so on. The last girl shakes hands with all the boys. How many boys are at the party?

Answer: _____

12. The school has six enrichment clubs. Mickey wants to join three of them. However, there are two clubs running at the same time, he only can at most choose one of them. How many different choices does he have?

Answer: _____ choices

13. A square garden has a square pavilion at its centre. The distance on each outer side of the pavilion to its corresponding side of the garden is 8 m. If the total area of the part of the garden outside the pavilion is 448 m^2, what is the area, in m^2, of the pavilion?



Answer: _____ m^2

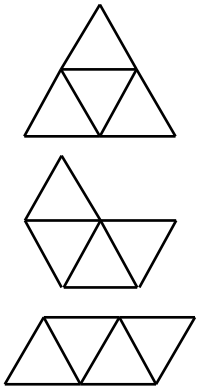
Questions 14 to 15, 20 marks each

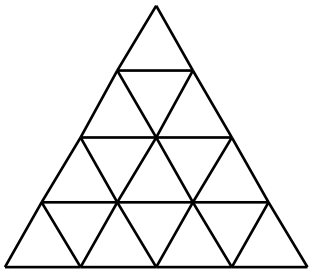
(Detailed solutions are needed for these two problems)

14. One digit is chosen from each of the three groups {1, 4, 7}, {2, 5, 8} and {3, 6, 9}. The chosen digits are arranged in any order to form a three-digit number. How many such three-digit numbers are divisible by 6?

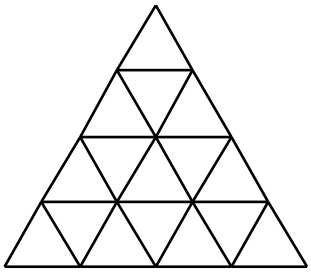
Answer: _____ numbers

15. Each side of an equilateral triangle is divided into 4 equal parts by 3 points, and these points are joined by lines parallel to the sides of the triangle, dividing into 16 small equilateral triangles. A tetriamond is a shape formed of 4 small equilateral triangles joined edge to edge.





(a) Show that if 4 of the small triangles are painted, then it may be impossible to fit any tetriamond inside the large triangle without covering up any part of the painted small triangles. (4 marks)



(b) Prove that if 3 of the small triangles are painted, then it is always possible to fit any tetriamond inside the large triangle without covering up any part of the painted small triangles. (16 marks)