International Mathematics Assessments for Schools

2016 MIDDLE PRIMARY DIVISION FIRST ROUND PAPER
Time allowed：75 minutes

When your teacher gives the signal, begin working on the problems.

INSTRUCTION AND INFORMATION

GENERAL
1. Do not open the booklet until told to do so by your teacher.
2. No calculators, slide rules, log tables, math stencils, mobile phones or other calculating aids are permitted. Scribbling paper, graph paper, ruler and compasses are permitted, but are not essential.
3. Diagrams are NOT drawn to scale. They are intended only as aids.
4. There are 20 multiple-choice questions, each with 5 choices. Choose the most reasonable answer. The last 5 questions require whole number answers between 000 and 999 inclusive. The questions generally get harder as you work through the paper. There is no penalty for an incorrect response.
5. This is a mathematics assessment, not a test; do not expect to answer all questions.
6. Read the instructions on the answer sheet carefully. Ensure your name, school name and school year are filled in. It is your responsibility that the Answer Sheet is correctly coded.

THE ANSWER SHEET
1. Use only pencils.
2. Record your answers on the reverse side of the Answer Sheet (not on the question paper) by FULLY filling in the circles which correspond to your choices.
3. Your Answer Sheet will be read by a machine. The machine will see all markings even if they are in the wrong places. So please be careful not to doodle or write anything extra on the Answer Sheet. If you want to change an answer or remove any marks, use a plastic eraser and be sure to remove all marks and smudges.

INTEGRITY OF THE COMPETITION
The IMAS reserves the right to re-examine students before deciding whether to grant official status to their scores.

Questions 1-10, 3 marks each

1. What is the value of $2016 - 20 \times 16$?
   （A）1696　　（B）1698　　（C）1706　　（D）1716　　（E）1726

2. Cubes of side length 1 cm are available in two colors. They are used to form a large cube of side length 3 cm, and two small cubes sharing a common face have different colors. What is the positive difference between the numbers of cubes in the two colors?
   （A）0　　（B）1　　（C）2　　（D）3　　（E）4
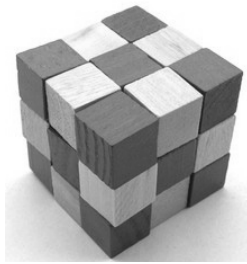
3. How many different rectangles (including squares) in different positions are there in the diagram below?
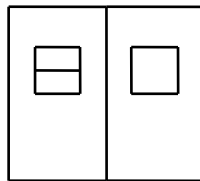
   （A）5　　（B）6　　（C）7　　（D）8　　（E）9

4. In a 6 by 6 table, each row and each column contains the letters A, B, C, D, E and F exactly once. All but four of the squares have been filled in. Which of the following should be chosen to fill in the blank squares?

A	B	C	D	E	F
B	C	D	E	F	A
C	D	E	F	A	B
D			A	B	C
E			B	C	D
F	A	B	C	D	E

   （A）
E	F
C	D

   （B）
E	F
F	A

   （C）
E	F
A	B

   （D）
A	B
C	D

   （E）
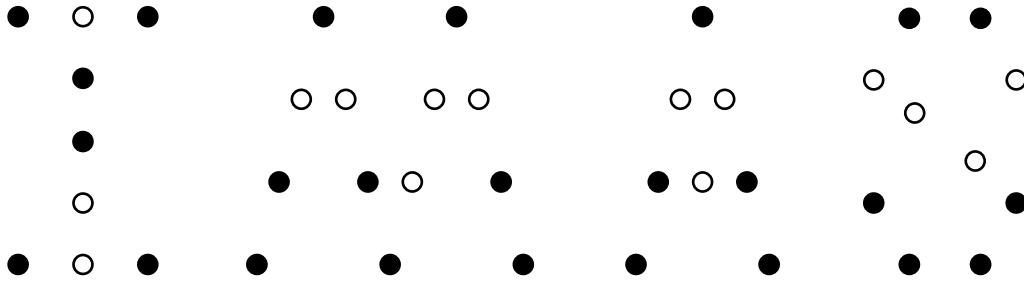 | B | C |
   |---|---|
   | C | D |

5. The letters IMAS are spelt out with the same size of black and white circles as shown in the diagram below. If the total area of the black circles is 50 cm^2, what is the total area, in cm^2, of the white circles?

    （A）26　　　（B）28　　　（C）30　　　（D）32　　　（E）34

6. Barry is flying from A to B on a 13:00 flight. The distance between A and B is 1800 km, and the speed of the plane is 600 km per hour. If the flight is delayed for 2 hours and no time difference between A and B, when will Barry arrive at B?
    （A）15：00　（B）16：00　（C）17：00　（D）18：00　（E）19：00

7. Jane feeds her cat at regular intervals. The first feeding is at 7:00 and the sixth feeding is at 22:00. Which of the following is not a feeding time for the cat?

    （A）10：00　（B）12：00　（C）13：00　（D）16：00　（E）19：00

8. If Mary buys 3 dolls, she will have 150 dollars left. If she buys 4 dolls, she will be 50 dollars short. All the dolls are at the same price. How much money does Mary have on her?

    （A）450　　　（B）550　　　（C）650　　　（D）750　　　（E）850

9. How many four-digit numbers using each of 0, 2, 4 and 5 once are divisible by 5?
    （A）4　　　　（B）6　　　　（C）8　　　　（D）10　　　　（E）12

10. Four teachers predict the order of finish among five classes, as shown in the table below. Every prediction is wrong! In which place does Class 2 finish?

	1st	2nd	3rd	4th	5th
Teacher A	Class 4	Class 3	Class 2	Class 5	Class 1
Teacher B	Class 4	Class 2	Class 5	Class 3	Class 1
Teacher C	Class 3	Class 1	Class 4	Class 2	Class 5
Teacher D	Class 1	Class 5	Class 2	Class 4	Class 3

   （A）1st　　　（B）2nd　　　（C）3rd　　　（D）4th　　　（E）5th

Questions 11-20, 4 marks each

11. A new arithmetic operation "∇" is such that $6\nabla3=218$ 、 $8\nabla4=232$ and $9\nabla3=327$. What is the value of $10\nabla2$?
    （A）125　　（B）205　　（C）250　　（D）520　　（E）525

12. A bamboo stick is lowered vertically into water to a depth of 50 cm, and a mark is made on the stick at the point of immersion. The stick is then taken out and turned upside down. Then it is lowered vertically into water to a depth of 50 cm, and a mark is made on the stick at the point of immersion. If the distance between the two marks is 25 cm, what are the possible lengths, in cm, of the bamboo stick?
    （A）75　　（B）100　　（C）125　　（D）75 or 125　　（E）150 or 250

13. If a boy is chosen as captain, then the number of boys among the other members is equal to the number of girls. If a girl is chosen as captain, then the number of girls among the other members is one half the number of boys. How many boys are there?
    （A）2　　　　（B）3　　　　（C）4　　　　（D）6　　　　（E）8

14. Use all of the numbers 1, 2, 3, 4, 5, 6, 7 and 8 to fill in the circles in the diagram below so that the sum of the numbers in the four circles of each of the two squares and each of the four trapezoids is constant. What is this constant sum?
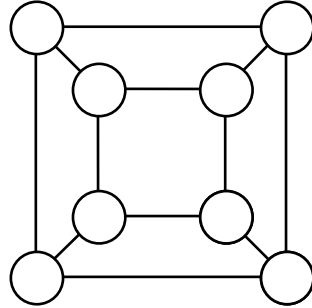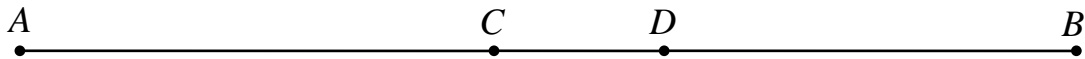
（A）8　　　　（B）10　　　　（C）12　　　　（D）16　　　　（E）18

15. Four identical dice are stacked on a desk, as shown in the diagram below. How many spots are on the face of the bottom die touching the top of the desk?
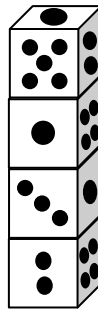
（A）1　　　　（B）3　　　　（C）4　　　　（D）5　　　　（E）6

16. *C* and *D* are two points on the segment *AB*, as shown in the diagram below. If *AD* is 30 cm longer than *BD* and *AC* is 14 cm shorter than *BC*, what is the length, in cm, of *CD*?

A　　　　　　　　　　　C　　　D　　　　　　　　B

（A）22　　　　（B）24　　　　（C）26　　　　（D）28　　　　（E）30

17. Simultaneously, X and Y start going from *A* to *B* while Z goes from *B* to *A*, each at a different constant speed. Z's speed is 3 times that of X. Ten minutes after their start, Y meets Z, and 10 minutes later, X meets Z. How many minutes will it take for Y to complete the whole trip?

（A）10　　　　（B）12　　　　（C）14　　　　（D）16　　　　（E）18

18. Hanna makes four straight cuts on a round cake. Into at most how many pieces can she cut it?

（A）8　　　　（B）10　　　　（C）11　　　　（D）12　　　　（E）14

19. Eight children are sharing 61 balloons. Each gets at least one, and everyone receives a different number. What is the smallest number of balloons that can go to the child receiving more balloons than the others?

（A）10　　　　（B）12　　　　（C）14　　　　（D）16　　　　（E）18

20. In how many ways can we choose six different numbers from 1, 2, 3, 4, 5, 6, 7 and 8 so that their sum is a multiple of 4?

（A）6　　　　（B）8　　　　（C）12　　　　（D）16　　　　（E）24

Questions 21-25, 6 marks each

21. In reading a story book, Lance reads one page more each day than the preceding day. On the fourth day, he reads 39 pages. After 9 days, he still has 48 pages to go. How many pages are there in this book?

22. The diagram below shows two overlapping rectangles consisting of region **I**, region **II** and the shaded region. The area of the rectangle *ABCD* is 6 times the area of the shaded region. The total area of the regions **I** and **II** is 9 times the area of the shaded region. The region **II** has area 12 cm^2. What is the area, in cm^2, of the shaded region?
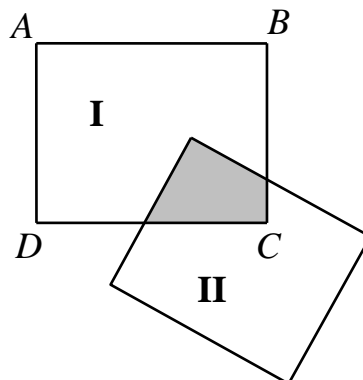
23. Fanny has 20 coins each worth 5 pence. Trading some of them for coins each worth 2 pence, she ends up with 32 coins. Then she trades some more 5-pence coins for coins each worth 1 penny, and now she has 56 coins. How many 5-pence coin does Fanny still have?

24. Each of 1, 2, 3, 4, 5, 6, 7, 8 and 9 is written on one card. A takes away two cards whose numbers have sum 14. B takes two cards whose numbers differ by 6. C takes away two cards with numbers whose numbers have product 12. D takes away two cards such that the number on one of them is twice the number on the other. What number is on the card not taken away?

25. The sum of a three-digit number and a two-digit number is 199. The five digits among the two numbers are all different. How many such three-digit numbers are there?

✳ ✳ ✳