International Mathematics Assessments for Schools

2017 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.
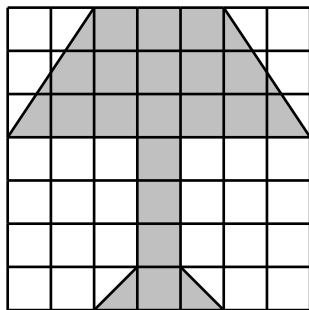
Questions 1-10, 3 marks each

1. What is the simplified value of $25 \times 99 + 55 \times 5$?
   (A)2750   (B)2850   (C)2900   (D)2950   (E)3000

2. In the arithmetic expression $\overline{1A} + \overline{B1} = 100$, what is the value of the digit B?
   (A)5   (B)6   (C)7   (D)8   (E)9

3. As shown in the figure below, there is a 7 × 7 grid paper where each small square has an area of 1 cm^2, what is the area, in cm^2, of the shaded part?


   (A)18   (B)19   (C)20   (D)21   (E)22

4. Students are arranged in a square formation with 8 rows and 8 columns. Now, 3 rows and 3 columns are removed, how many students were reduced?
   (A)9   (B)24   (C)27   (D)39   (E)45

5. A train travels between City A to City B. There are 4 other stops in-between these two cities. How many different kinds of tickets are there? (Note: The ticket from City A to City B and City B to City A must not be the same).
   (A)8   (B)12   (C)20   (D)24   (E)30

6. In the figure shown below, a square is embedded in a rectangle. If $AB = 9$ cm and $CD = 15$ cm, then what is the perimeter, in cm, of the rectangle?
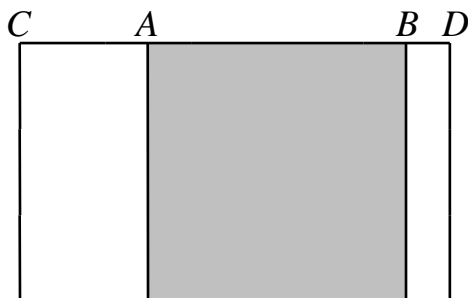

   (A)48   (B)50   (C)52   (D)54   (E)56

7. In a class, 22 students take painting course, 28 students take piano course, 10 students take both courses and 5 students take none of the courses. Find the number of students in the class.
   (A)40   (B)45   (C)50   (D)55   (E)65

8. As shown in the figure below, points C and D are on segment AB. The length of AC is 6 cm longer than the length of CD. The length of BD is twice as the length of AC. How much, in cm, is BD longer than AD?

   A   C   D   B
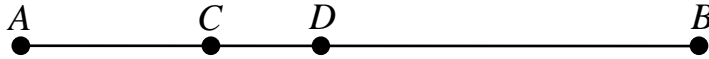
   (A)3   (B)6   (C)9   (D)12   (E)15

9. The sum of four consecutive odd integers is 72. What is the largest integer among the four integers?
   (A)15   (B)17   (C)19   (D)21   (E)23

10. Each of the digits 1, 2, 3, 4, 5 and 6 are printed on one of the 6 cards. Choose two different cards to form a 2-digit number. List down all possible 2-digit numbers in increasing order on a sheet of paper, what is the 21st number in the list?
    (A)43   (B)45   (C)46   (D)51   (E)61

Questions 11-20, 4 marks each

11. If $(\Delta \div 2 - 2) \times 2 + 2 = 222,$ then what is the value of the symbol Δ?
    (A)56   (B)224   (C)228   (D)876   (E)884

12. Positive integers are arranged in the array as shown below, what is the sum of all the integers located on the fourth row?

    $$1$$
    $$2 \quad 3 \quad 4$$
    $$5 \quad 6 \quad 7 \quad 8 \quad 9$$
    $$\ldots$$

    (A)75   (B)81   (C)89   (D)91   (E)189

13. Define a new operation "$*$" such that $4*2=86$, $6*3=189$, $8*4=3212$ and $9*3=2712$. Find $10*2$.
    (A)128   (B)208   (C)2008   (D)2012   (E)2020

14. The average score of Peter in several math exams is 88. On the last exam, he must get 98 in order to raise his average score to 90. How many exams has he taken in total?
(A)3　　　　(B)4　　　　(C)5　　　　(D)6　　　　(E)7

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15. How many different ways are there to place 2 identical black balls and 2 identical white balls in three different boxes *A*, *B* and *C* such that each box should contain at least one ball?
(A)6　　　　(B)9　　　　(C)12　　　　(D)15　　　　(E)18

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16. As shown in the figure below, there is a 3 × 3 grid paper where each small square has an area of 1 cm^2. Find the area, in cm^2, of the shaded part.

(A)3　　　　(B)4　　　　(C)5　　　　(D)6　　　　(E)7

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17. The sum of the digits of a 2-digit number is equal to 9. If the 2-digit number is multiplied by 5, the sum of all digits is still 9. How many such 2-digit numbers are there?
(A)4　　　　(B)5　　　　(C)7　　　　(D)8　　　　(E)9

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18. As shown in the figure below, an ant starting from point *A* crawl along the path to point *B*. It is required that both point *C* and point *D* can only pass once, how many different paths can the ant crawl?

(A)6　　　　(B)8　　　　(C)10　　　　(D)12　　　　(E)18

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19. Arrange black and white beads according to the pattern shown in the figure below. If the total number of beads is 97, how many black beads are there?

(A)38　　　　(B)39　　　　(C)40　　　　(D)41　　　　(E)42

20. There are 6 persons A, B, C, D, E and F attend a meeting. Some of them shake hands with one another. In the final count up, A shakes 5 hands, B shakes 4, C shakes 3, D shakes 2 and E shakes 1. How many does F shake?
    (A)1   (B)2   (C)3   (D)4   (E)5

Questions 21-25, 6 marks each

21. The shape enclosed by solid lines in the figure below is composed of unit squares. What is the maximum area of a rectangle that can be cut from the shape along grid lines?
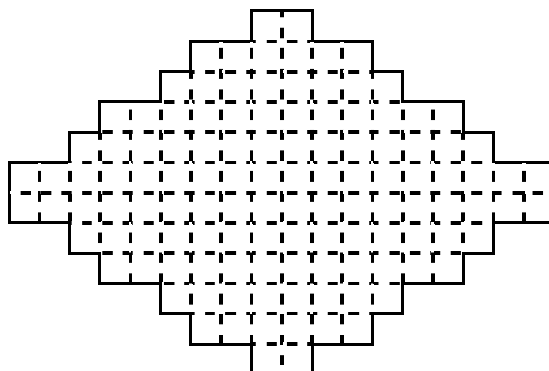
22. A box is filled with blue and green beads. The number of the blue beads is twice as many as the green beads. Now take 6 blue beads and 4 green beads each time. When the green beads are emptied, 6 blue beads are left. Please find the total number of beads.

23. The teacher gave three students the same amount of money to buy stationery. A bought 3 pens and has $3 left. B bought 5 crayons and has $5 left. C bought 7 pencils and has $3 left. If the price for each item is an integer, what is the least total amount of money the teacher gave them?

24. Two students are computing $A \times B$. The first student mistakenly took the last digit of A as 2 instead of 7 and got a product of 418. The second student mistakenly the tens digit of A as 3 instead of 2 and got a product of 703. What is the value of B?

25. The students in a research class are clustered into two groups: the morning and afternoon sessions. A student takes part in exactly one group in each session (the two groups in each session can be different and the number of students in each group can be different). Each group has at least one student and at most 4 students. Each student reports the number of students in the group he or she belongs to in two sessions. One finds that no two students report the same pair of numbers (with order, for example, (1, 4) and (4, 1) are different). What is maximum number of students in the class?

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