

International Mathematics Assessments for Schools

2012 MIDDLE PRIMARY DIVISION FIRST ROUND PAPER

Time allowed : 75 minutes

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

THE ANSWER SHEET

1. Use only lead 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.

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Questions 1-10, 3 marks each

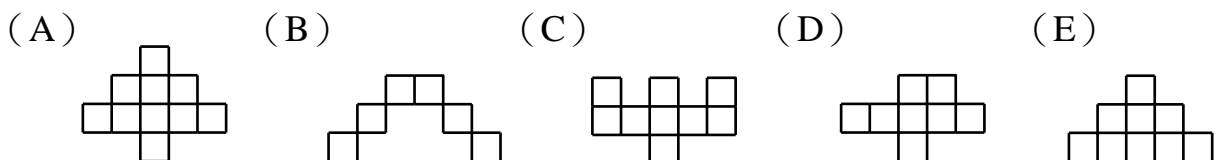
1. We want to cut a 20 m stick into shorter sticks of length 4 m. We can only cut one piece of stick at a time. How many cuts are required?
(A) 3 (B) 4 (C) 5 (D) 6 (E) 7
-

2. What number must replace the \square in the mathematical sentence $\square + 5 = 13 - 6$ to make it correct?
(A) 1 (B) 2 (C) 3 (D) 4 (E) 5
-

3. Which of the following number is less than 2,010,000?
(A) two millions and ten thousands (B) 2,100,000
(C) one million and twenty thousands (D) 20,100,000
(E) two millions and one hundred thousands
-

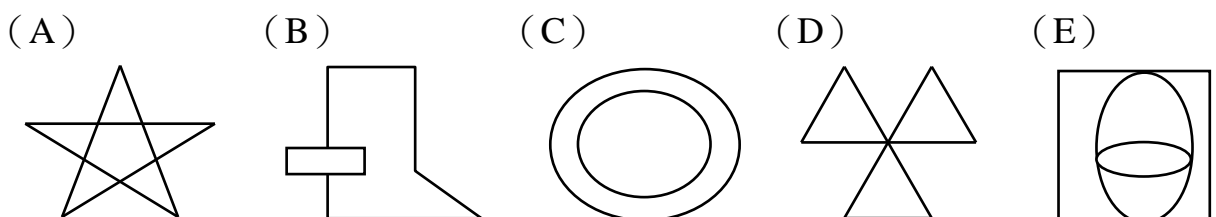
4. What is the value of $999 + 99$?
(A) 1088 (B) 1098 (C) 1099 (D) 1889 (E) 1989
-

5. The following figures are formed by identical squares. Which figure has the longest perimeter?



6. Starting from the forest, a rabbit hopped 500 m to the north, and then reached a farm by hopping 500 m to the west. In which direction from the forest is the farm?
(A) East (B) South (C) Northwest (D) North (E) West
-

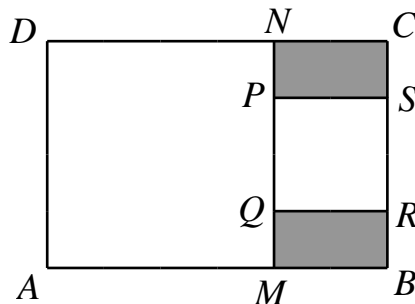
7. Which of the following figures cannot be drawn without lifting the pencil off the paper and without going over any line twice?



8. What operation signs must replace \bigcirc and \square so that the mathematical sentence $2 + 8 + 3 = 2 \bigcirc 8 \square 3$ is correct?
 (A) $+$ for \bigcirc and \times for \square (B) \times for \bigcirc and $-$ for \square
 (C) $+$ for \bigcirc and \div for \square (D) \times for \bigcirc and \div for \square
 (E) \times for \bigcirc and $+$ for \square
-
9. A ray consists of a point on a line and all the points on that line on one side of that point. How many rays can we draw through a point on a plane?
 (A) 1 (B) 2 (C) 4
 (D) 8 (E) Infinitely many
-
10. The birthdays of two sisters are on the same day. The elder sister is 4 years older than the younger sister. When the sum of their ages reaches 50 years, how old is the younger sister?
 (A) 12 (B) 20 (C) 23 (D) 25 (E) 27
-

Questions 11-20, 4 marks each

11. The diagram below shows two squares $AMND$ and $PQRS$ inside a rectangle $ABCD$. The areas of the two squares are 16 cm^2 and 4 cm^2 respectively. What is the sum of area of the shaded regions in cm^2 ?



- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7
-
12. How many zeros are there in the end of the product of $20 \times 30 \times 40 \times 50$?
 (A) 1 (B) 2 (C) 4 (D) 5 (E) 6
-
13. Some students form a rectangle. Joseph is in the fourth row if we count from the front and in the seventh row if we count from the back. He is in the third column if we count from left and in the ninth column if we count from the right. How many students are there?
 (A) 90 (B) 100 (C) 110 (D) 120 (E) 132
-

14. Two pieces of straw can be joined together by overlapping one with the other for a length of 2 cm. If three pieces of straw are joined together to form a magic wand, what is the length, in cm, of the magic wand?

(A) 54 (B) 55 (C) 56 (D) 58 (E) 60

15. In the mathematical sentence below, A , B , C , D , E and F represent six distinct digits from 0 to 9. What is the numeral value of E ?

$$\begin{array}{r}
 6 A \\
 \times 3 5 \\
 \hline
 3 3 B \\
 1 C 8 \\
 \hline
 D E F B
 \end{array}$$

(A) 0 (B) 1 (C) 2 (D) 3 (E) 4

16. A soccer match consists of two halves each lasting 45 minutes, with a 15-minute break in between. If a soccer match begins at 13:00 and there is no extension of the game, at what time will it end?

(A) 13 : 45 (B) 14 : 00 (C) 14 : 30 (D) 14 : 35 (E) 14 : 45

17. Study the mathematical sentences below:

$$74 \times 6 = 444 \text{ ,}$$

$$74 \times 12 = 888 \text{ ,}$$

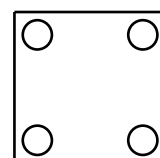
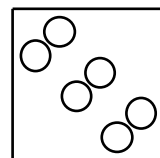
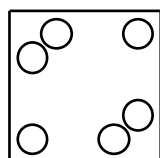
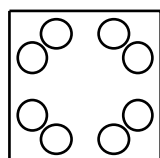
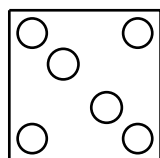
$$74 \times () = 444888$$

What number must be filled in the parentheses so that the last sentence is correct?

(A) 1266 (B) 1206 (C) 6088 (D) 6612 (E) 6012

18. Let us fold a square piece of paper along a diagonal to make a triangle. Cut a small round hole near each of the three corners of the triangle. Which of the following figures is obtained when we unfold the piece of paper?

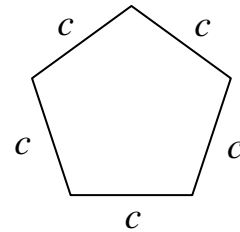
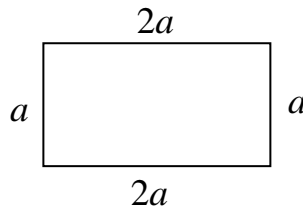
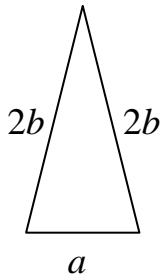
(A) (B) (C) (D) (E)



19. Susan wrote five numbers on the board, represented by A , B , C , D and E . A is larger than B , C is larger than D , C is smaller than E , D is larger than B , and E is smaller than A . Which number is the third largest?

(A) A (B) B (C) C (D) D (E) E

20. The three figures in the diagram below have equal perimeters. What is $a : b : c$?



(A) $1 : 1 : 1$

(B) $2 : 4 : 5$

(C) $4 : 6 : 5$

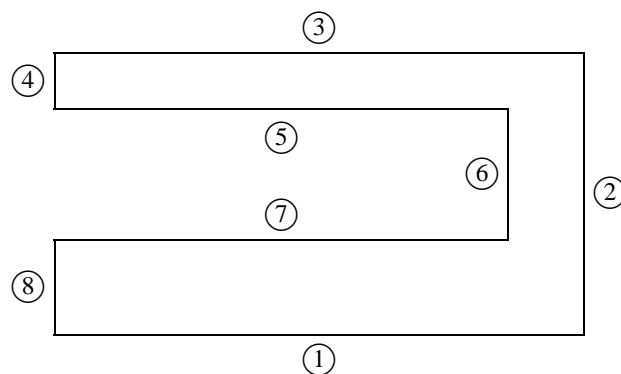
(D) $16 : 20 : 25$

(E) $20 : 25 : 24$

Questions 21-25, 6 marks each

21. The mirror image of a mathematical expression reads $___ = 8105 - 5015$. What is the correct difference?

22. The following figure is composed of eight line segments. At the intersection of every two segments is a right angle, and each line segment is marked with a number. The easiest method to find the perimeter of the figure is by measuring three segments in the figure. What is the smallest three-digit number that is formed by the corresponding numbers of the three segments?



23. Let \triangle , \square and \star represent three distinct digits. If $7\triangle 90901$ is larger than $79\square 9001$, which is in turn larger than $798900\star$, what is the value of $\triangle + \square + \star$?

24. The number of bicycles in the school bicycles lot is a three-digit number, and the number of bicycle wheels is also a three-digit number. These six digits are 2, 3, 4, 5, 6 and 7 in some order. At most how many bicycles are there?

25. Helen has some \$1, \$2 and \$5 coins. The total value is \$80. All the \$1 coins may be traded in for \$10 coins, resulting in 36 fewer coins. All the \$5 coins may be traded in for \$10 coins, and all the \$2 coins may be traded in for \$5 coins. What is the largest possible numbers of coins Helen has?
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