

International Mathematics Assessments for Schools

2013 UPPER 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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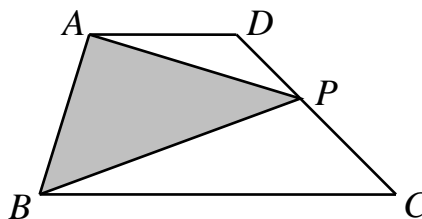
Questions 1-10, 3 marks each

1. What is the value of the expression $3 \times 11 \times 61 + 3 + 11 + 61$?
(A) 2013 (B) 2088 (C) 2113
(D) 4026 (E) 4052169
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2. Which of the following is the closest in length to one day?
(A) 0.9 days (B) 1.2 days (C) 23 hours
(D) 26 hours (E) 1410 minutes
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3. Walter has two options when going to school. He can (a) walk 3 minutes to the bus stop and then ride the bus for 15 minutes to the school, or (b) walk 5 minutes to the subway stop and then ride the subway for 6 minutes and walk 5 minutes to school. If he does not have to wait for the bus at the bus stop, nor the train on the subway station, what is the minimum number of minutes required for him to get to school?
(A) 15 (B) 16 (C) 17 (D) 18 (E) 19
-
4. Which of the following five numbers is divisible by 6?
(A) 98 (B) 163 (C) 192 (D) 212 (E) 254
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5. Zachary has a computer program which accepts an input and produced an output. Some of the data are shown in the following table.

Input	1	2	3	4	5	6	7
Output	4	7	10	13	16	?	22

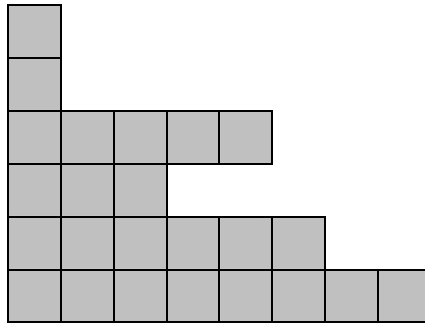
What is the output when the input is 6?

- (A) 17 (B) 18 (C) 19 (D) 20 (E) 21
-
6. In the diagram, AD is parallel to BC . A point P moves from C to D along the side CD . Which of the following is the accurate description of the change in the area of triangle ABP during the motion?



- (A) increasing (B) decreasing (C) increasing then decreasing
(D) decreasing then increasing (E) unchanged
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7. Langford has a square piece of chocolate divided into unit squares. After eating some of the unit squares, what is left of the square piece is shown in the diagram. At least how many unit squares of chocolate must Langford have eaten?

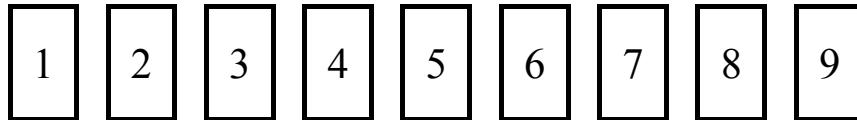


- (A) 20 (B) 24 (C) 36 (D) 40 (E) 64

8. When $\frac{22}{7}$ is expressed as a decimal without rounding, how many decimal places should we take so that the positive difference between this result and 3.14159 is as small as possible?

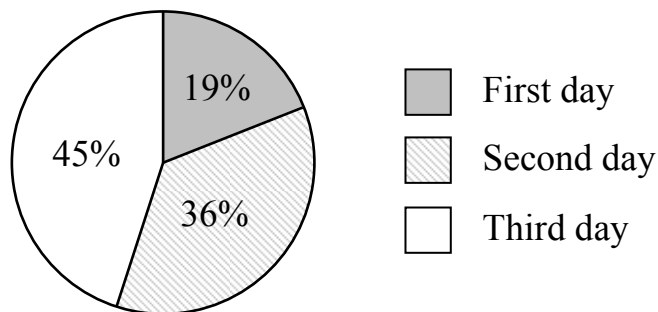
- (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

9. The diagram shows nine cards numbered 1 to 9. One of the cards is removed, and the sum of the numbers on the remaining cards is 8 times the number on the card that was removed. What is the number on the card that was removed?



- (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

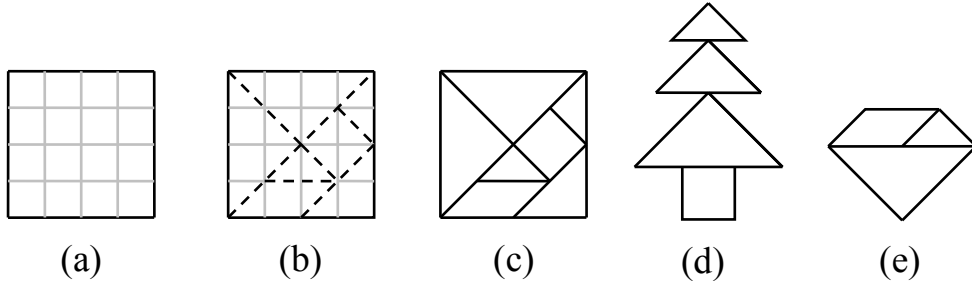
10. Mrs. Huang spent three days making ornaments. The diagram shows the percentage of the total number of ornaments that she made on each day. If she made 152 ornaments on the first day, how many ornaments did she make on the third day?



- (A) 190 (B) 360 (C) 450 (D) 720 (E) 800

Questions 11-20, 4 marks each

11. The tangram puzzle is made as shown in the diagram. Start with a 4 by 4 grid as shown in figure (a) and cut along the dotted lines as shown in (b). This will result with seven pieces as in (c). Both figures (d) and (e) are constructed from some of these pieces. What is the ratio between the area of the figure in (d) and the area of the figure in (e)?

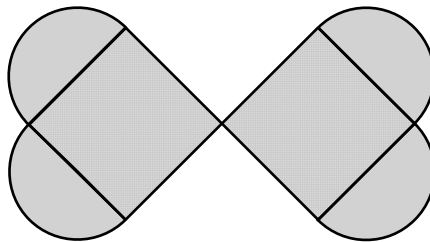


- (A) 1 : 1 (B) 3 : 1 (C) 5 : 3 (D) 9 : 7 (E) 11 : 5

12. The two digits of each of four consecutive two-digit numbers are multiplied and the respective products are 24, 28, 32 and 36. What is the sum of the four consecutive numbers?

- (A) 120 (B) 136 (C) 160 (D) 172 (E) 190

13. Lily constructs a figure, in the shape of a butterfly, as shown in the diagram. She uses two squares of side length 6 cm and four semicircles with diameter 6 cm. If we take π to be 3.14, what is the area of the figure?



- (A) 36 (B) 72 (C) 128.52 (D) 185.04 (E) 298.08

14. A box contains ten black balls and ten white balls and there are no balls outside the box. In each step Mickey is allowed to do one of the two things. (a) He may take a white ball and a black ball from the box and place them outside. (b) If there is at least one black ball outside the box, he may take a white ball from the box and place it outside, and return a black ball from outside into the box. After six steps Mickey counts the number of balls outside the box. How many possible answers are there?

- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

15. Bucket A is one-sixth full of water while bucket B contains 60 litres of water. If we empty the water in bucket B into bucket A then bucket A is half full of water. If instead we empty the water in bucket A into bucket B then bucket B is full. What is the capacity, in litres, of bucket B?
- (A) 70 (B) 80 (C) 90 (D) 100 (E) 180

16. The diagram shows an addition table on three numbers X , Y and Z . A number in the table is the sum of the two numbers, one in the same row and the other in the same column, which are represented by letters. For instance, $X+Y=16$. What is the product of the numbers X , Y and Z ?

+	X	Y	Z
X	/	16	19
Y	16	/	23
Z	19	23	/

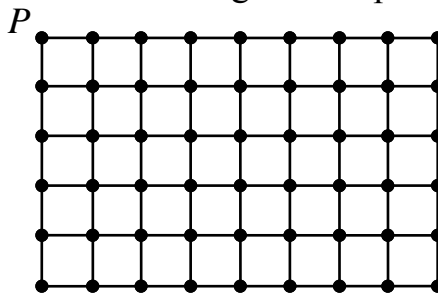
- (A) 780 (B) 800 (C) 850 (D) 900 (E) 960

17. We define $a \Theta b = \frac{a+b}{2}$. If $\frac{3}{4} \Theta \left(\frac{1}{6} \Theta \square \right) = \frac{1}{2}$, what number is represented by \square ?

- (A) 3 (B) $\frac{1}{3}$ (C) $\frac{13}{24}$ (D) 4 (E) $\frac{1}{4}$

18. Mickey is asked to multiply three positive integers, but he adds them instead. Amazingly, his correct answer is equal to the correct answer for the multiplication problem. What is the sum of these three numbers?
- (A) 3 (B) 4 (C) 5 (D) 6 (E) 7

19. There are 54 grid points on the 5 by 8 grid, shown in the diagram, where the side of each small square is 1 cm. Starting from point P , an ant crawls from grid point to grid point along the grid lines, visiting each grid point exactly once before returning to P . What is the maximum length of its path, in cm?



- (A) 26 (B) 30 (C) 36 (D) 54 (E) 93

24. The number 1234567891011...198199200 is obtained by writing 1 to 200 in ascending order in a row. We now divide this number into blocks of length three, resulting in a sequence of three-digit numbers 123, 456, 789, 101, 112, and so on. What is the 35th number in this sequence?

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25. The six faces of a cubical die are labelled with six different positive integers. If the numbers on any two adjacent faces differ by at least 2, what is the minimum value of the sum of these six numbers?

