The Chinese High School
Mathematics Learning And Research Centre

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Singapore Mathematical Olympiad
for Primary Schools 2001

First Round
2 hours
(150 marks)

Instructions to Participants

Attempt as many questions as you can.

Neither mathematical tables nor calculators may be used.

Write your answers in the answer boxes on the **separate answer sheet** provided.

Working may be shown in the space below each question.

Marks are awarded for correct answers only.

This question paper consists of 16 printed pages (including this page)

Number of correct answers for Q1 to Q10 : _____   Marks (**4**) : _____
Number of correct answers for Q11 to Q20 : _____   Marks (**5**) : _____
Number of correct answers for Q20 to Q30 : _____   Marks (**6**) : _____

Total Marks for **First Round** : _____

1. Find the value of

$$0.1 + 0.11 + 0.111 + .\ .\ .\ . + 0.1111111111 .$$

2. Find the missing number in the box.

$$5 \times \boxed{} \div 3 \times 4 - 299 = 2001$$

3. Find the missing number in the following number sequence.

1, 4, 10, 22, 46, _____, 190 , . . .

4. If numbers are arranged in 3 rows A, B and C according to the following table, which row will contain the number 1000 ?

A   1,   6,   7,   12,   13,   18,   19, ...

B   2,   5,   8,   11,   14,   17,   20, ...

C   3,   4,   9,   10,   15,   16,   21, ...

5. How many 5-digit numbers are multiples of 5 and 8 ?

6. John started from a point A, walked 10 m forwards and then turned 36° right. Again he walked 10 m forwards and then turned 36° right. He continued walking in this manner and finally returned to the starting point A. How many metres did he walk altogether ?
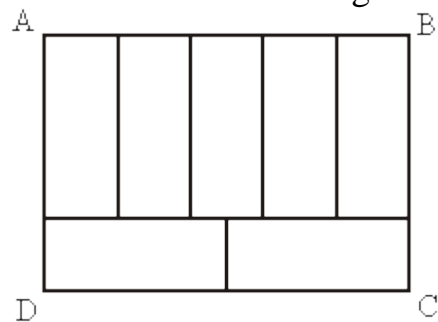
7. What fraction of the figure is shaded ?
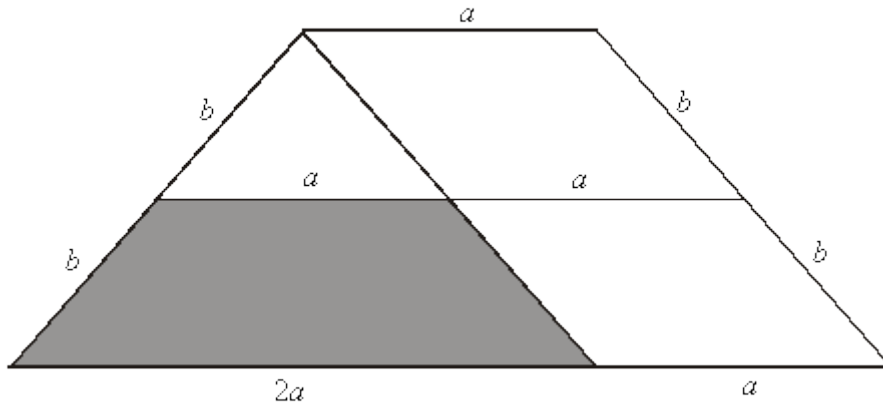
8. How many triangles are there in the figure ?
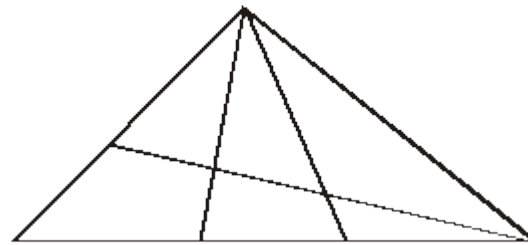
9. Between 12 o'clock and 1 o'clock, at what time will the hour hand and minute hand make an angle of $110°$?

10. The rectangle ABCD of perimeter 68 cm can be divided into 7 identical rectangles as shown in the diagram. Find the area of the rectangle ABCD.

**11.** Find the smallest number such that

     (i)   it leaves a remainder 2 when divided by 3 ;

     (ii)   it leaves a remainder 3 when divided by 5 ;

     (iii)   it leaves a remainder 5 when divided by 7 .

12. The sum of two numbers is 168. The sum of $\frac{1}{8}$ of the smaller number and $\frac{3}{4}$ of the greater number is 76. Find the difference between the two numbers.

13. There are 325 pupils in a school choir at first. If the number of boys increases by 25 and the number of girls decreases by 5%, the number of pupils in the choir will become 341. How many boys are there in the choir at first ?

14. Mr Tan drove from Town A to Town B at a constant speed of $40 \ km/h$. He then drove back from Town B to Town A at a constant speed of $70 \ km/h$. The total time taken for the whole journey was 5.5 h. Find the distance between the two towns.

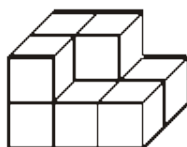**15.**
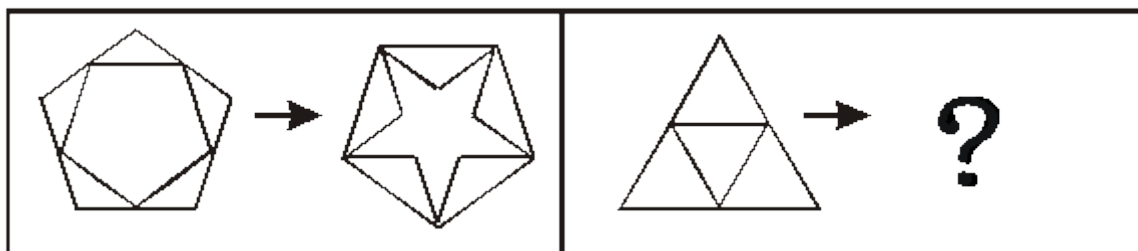
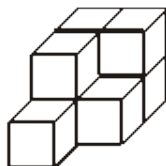Which one of the following is the missing figure ?
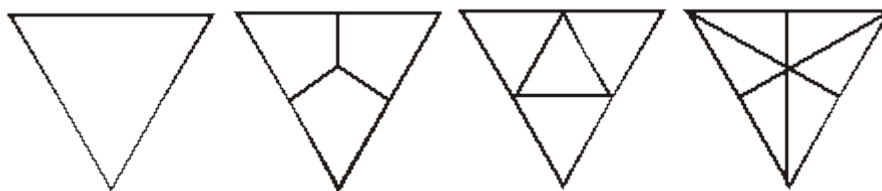
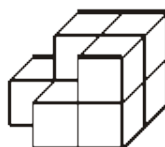(A)   (B)   (C)   (D)

16. Which two of the following solid figures can be fitted together to form a cuboid ?

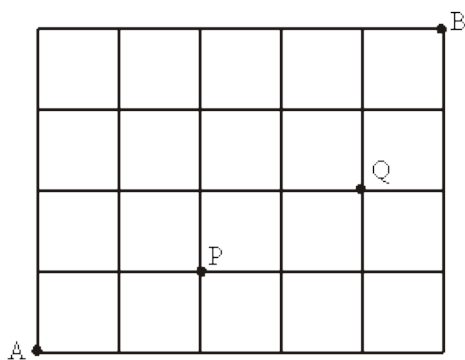A   B   C   D
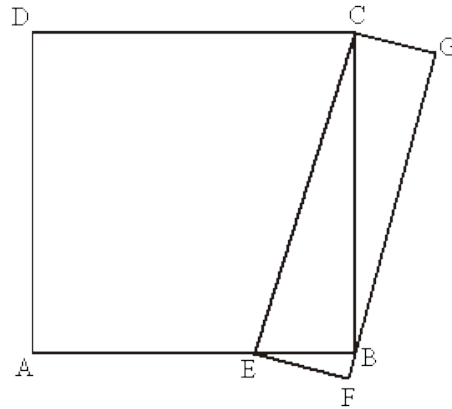
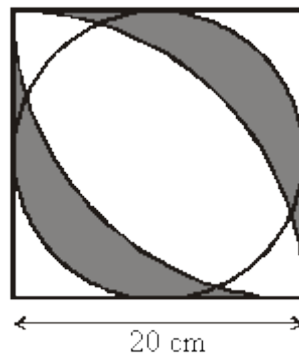**17.** In how many different ways can you walk from A to B in the direction ↑ or → , without passing through P and Q ?


18. In the figure, ABCD is a square and EFGC is a rectangle. The area of the rectangle is 24 cm^2. Given that $AE = \dfrac{5}{8} AB$, find the length of one side of the square.

19. The diagram shows a circle and 2 quarter circles in a square. Find the area of the shaded region. (Take $\pi = 3.14$.)

20 cm

20. The area of rectangle ABCD is $24\ cm^2$. The areas of triangles ABE and ADF are $4\ cm^2$ and $9\ cm^2$ respectively. Find the area of the triangle AEF.
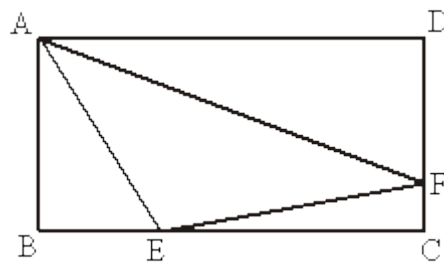
21. A rectangular paper has a circular hole on it as shown. Draw a straight line to divide the paper into two parts of equal area..

22. What is the 2001th number in the following number sequence ?

$$\frac{1}{1}, \frac{2}{1}, \frac{1}{2}, \frac{3}{1}, \frac{2}{2}, \frac{1}{3}, \frac{4}{1}, \frac{3}{2}, \frac{2}{3}, \frac{1}{4}, \frac{5}{1}, \frac{4}{2}, \frac{3}{3}, \cdots$$

23. There are 25 rows of seats in a hall, each row having 30 seats. If there are 680 people seated in the hall, at least how many rows have an equal number of people each ?

24. In the following columns, *A, B, C* and *X* are whole numbers. Find the value of *X*.

A		A		A		A		
B		A		A		B		
B		B		A		C		A
B		B		B		C		B
C		C		C		C		C
38		36		34		28		X

25. There were 9 cards numbered 1 to 9. Four people A, B, C and D each collected two of them.

A said : " The sum of my numbers is 6. "
B said : " The difference between my numbers is 5. "
C said : " The product of my numbers is 18. "
D said : " One of my numbers is twice the other. "

What is the number on the remaining card ?

26. Minghua poured out $\frac{1}{2}$ of the water in a container.

In the second pouring, he poured out $\frac{1}{3}$ of the remaining water ;

In the third pouring, he poured out $\frac{1}{4}$ of the remaining water ;

In the forth pouring, he poured out $\frac{1}{5}$ of the remaining water ;
and so on.

After how many times of pouring will the remaining water be exactly $\frac{1}{10}$ of the original amount of water ?

27. A bus was scheduled to travel from Town X to Town Y at constant speed V km/h. If the speed of the bus was increased by 20%, it could arrive at Town Y 1 hour ahead of schedule.

Instead, if the bus travelled the first 120 km at V km/h and then the speed was increased by 25%, it could arrive at Town Y $\frac{4}{5}$ hours ahead of schedule. Find the distance between the two towns.
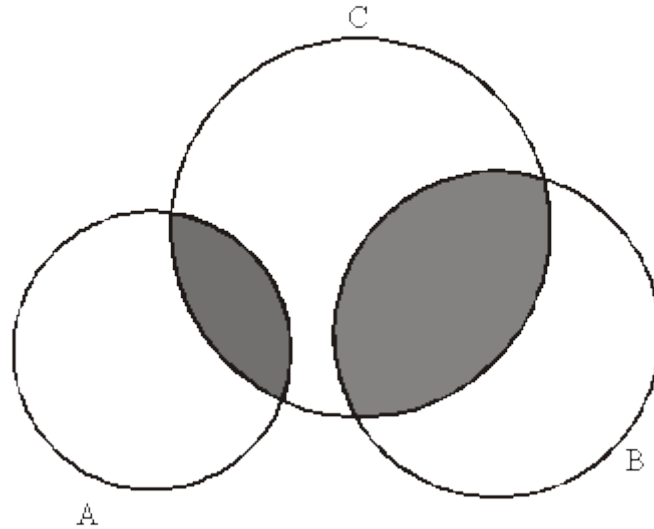
28. The diagram shows three circles A, B and C.

$\frac{1}{3}$ of the circle A is shaded,

$\frac{1}{2}$ of the circle B is shaded,

$\frac{1}{4}$ of the circle C is shaded.

If the total area of A and B is equal to $\frac{2}{3}$ of the area of C, find the ratio of the area of A to the area of B.

29. Given that $m = \underbrace{999\ .\ .\ .\ .\ .\ 99}_{2001\ \text{digits}}$, $n = \underbrace{888\ .\ .\ .\ .\ .\ 88}_{2001\ \text{digits}}$,

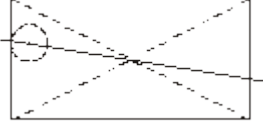find the sum of the digits in the value of $m \times n$.

30. Each side of a pentagon ABCDE is coloured by one of the three colours : red, yellow or blue. In how many different ways can we colour the 5 sides of the pentagon such that any two adjacent sides have different colours ?
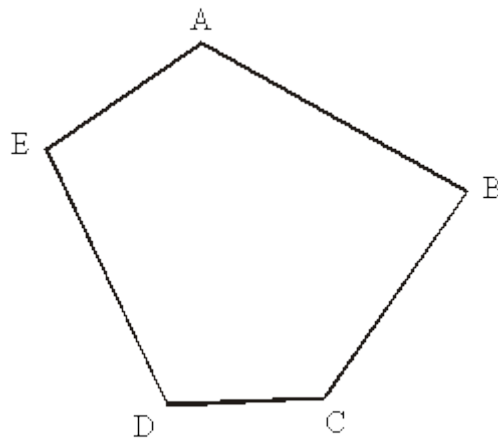
Singapore Mathematical Olympiad for Primary Schools 2001
First Round – Answers Sheet

	Answers	For markers' use only
1	1.0987654321	
2	345	
3	94	
4	Row C	
5	2250	
6	100 m	
7	$\frac{3}{8}$	
8	15	
9	12.20	
10	280 cm²	

Questions 1 to 10

each carries 4 marks

11	68	
12	8	
13	145	
14	140 km	

	Answers	For markers' use only
17	48	
18	8 cm	
19	129 cm²	
20	9 cm²	

Questions 11 to 20

each carries 5 marks

21		The line drawn must pass through the centre of the circle and of the rectangle.
22	$\frac{16}{48}$	
23	4	
24	20	
25	9	
26	9	
27	360 km	
28	3:1	
29	18009	

15	A		30	30	
16	B and C		**Questions 21 to 30** **each carries** 6 **marks**		