Mathlete Training Centre
SMOPS 2001

1. (SMOPS 01Q1) Find the value of

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

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2. (SMOPS 01Q2) Find the missing number in the box.

$5 \times \square \div 3 \times 4 - 299 = 2001$

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3. (SMOPS 01Q3) Find the missing number in the following number sequence.
   $1, 4, 10, 22, 46, \_\_\_\_, 190, \ldots$

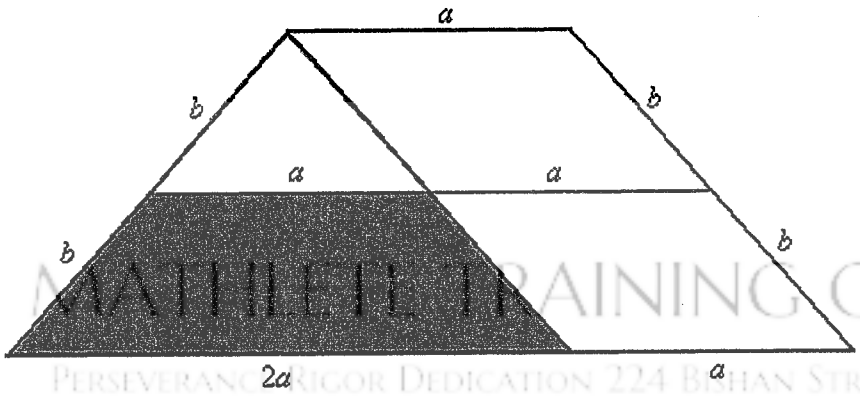
4. (SMOPS 01Q4) If numbers are arranged in 3 rows A,B and C according to the following table, which row will contain the number 1000?

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. (SMOPS 01Q5) How many 5-digit numbers are multiples of 5 and 8?

6. (SMOPS 01Q6) 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. (SMOPS 01Q7) What fraction of the figure is shaded?



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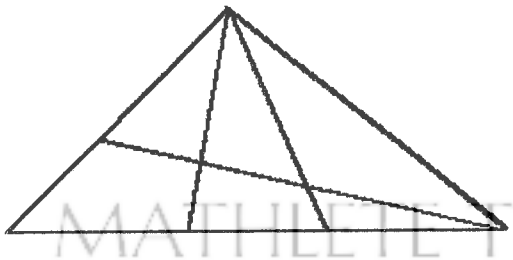
8. (SMOPS 01Q8) How many triangles are there in the figure?



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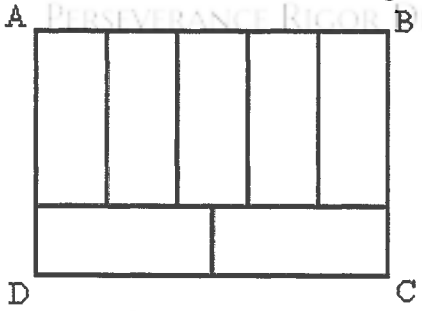
9. (SMOPS 01Q9) Between 12 o'clock and 1 o'clock, at what time will the hour hand and minute hand make an angle of 110°

10. (SMOPS 01Q10) The rectangle ABCD of perimeter 68cm can be divided into 7 identical rectangles as shown in the diagram. Find the area of the rectangle ABCD.



11. (SMOPS 01Q11) 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.

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12. (SMOPS 01Q12) 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.

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13. (SMOPS 01Q13) 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?

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14. (SMOPS 01Q14) Mr Tan drove from Town A to Town B at a constant speed of 40km/h. He then drove back from Town B to Town A at a constant speed of 70km/h. The total time taken for the whole journey is 5.5h. Find the distance between the two towns.

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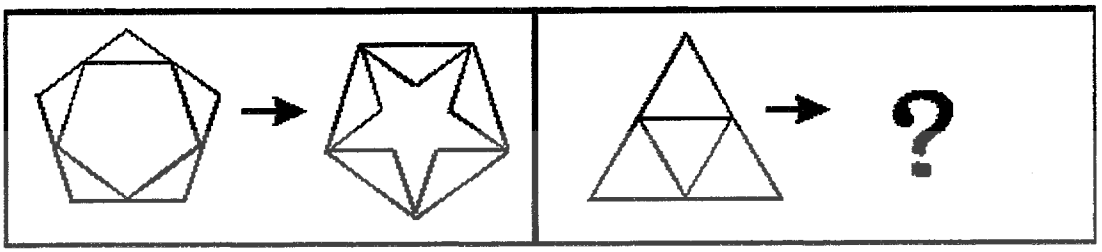
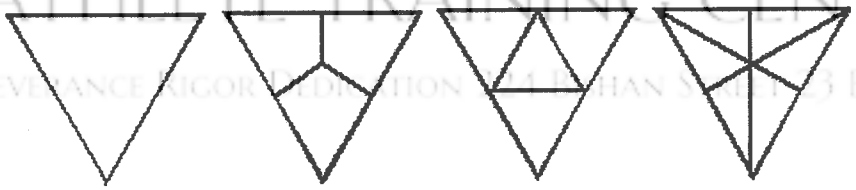
15. (SMOPS 01Q15)

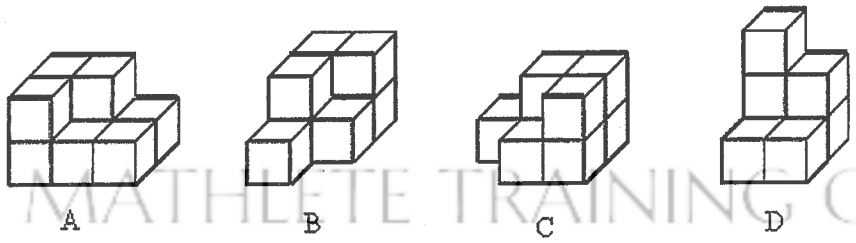


Which one of the following is the missing figure ?

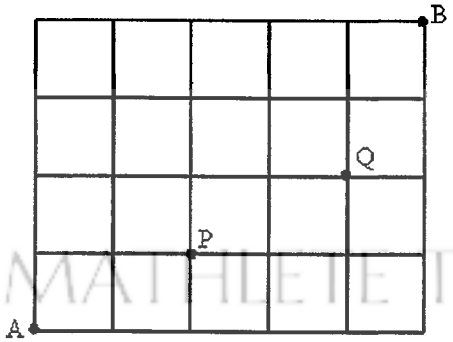


(A) (B) (C) (D)

16. (SMOPS 01Q16) Which two of the following solid figures can be fitted together to form a cuboid?



17. (SMOPS 01Q17) In how many different ways can you walk from A to B in the direction $\uparrow$ or $\rightarrow$, without passing through P and Q?



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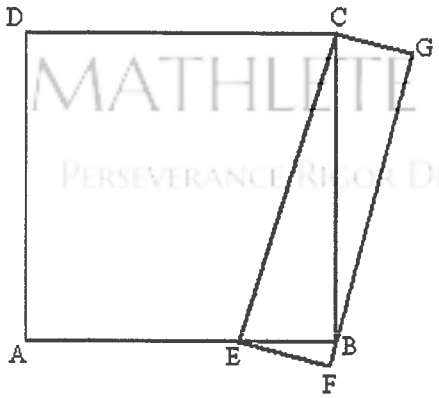
18. (SMOPS 01Q18) In the figure, ABCD is a square and EFGC is a rectangle. The area of the rectangle is 24cm^2. Given that $AE = \frac{5}{8}AB$, find the length of one side of the square.



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19. (SMOPS 01Q19) The diagram shows a circle and 2 quarter circles in a square. Find the area of the shaded region.

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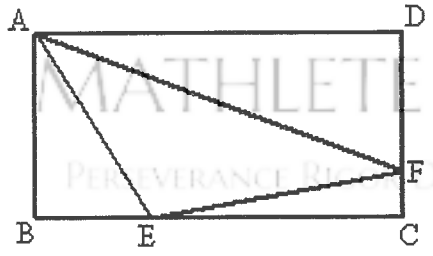
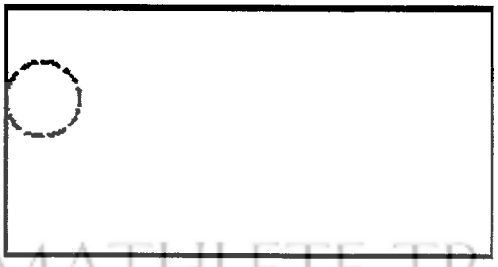
20. (SMOPS 01Q20) The area of rectangle ABCD is 24 cm^2. The areas of triangles ABE and ADF are 4cm^2 and 9cm^2 respectively. Find the area of the triangle AEF.



21. (SMOPS 01Q21) 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.



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22. (SMOPS 01Q22) What is the 2001th number in the following number sequence?
$\frac{1}{1}, \frac{2}{1}, \frac{1}{2}, \frac{3}{1}, \frac{2}{2}, \frac{1}{3}, \frac{4}{1}, \frac{3}{2}, \frac{2}{3}, \frac{1}{4}, \frac{5}{1}, \frac{4}{2}, \frac{3}{3}, \ldots$

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23. (SMOPS 01Q23) 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. (SMOPS 01Q24) 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. (SMOPS 01Q25) 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?

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26. (SMOPS 01Q26) 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?

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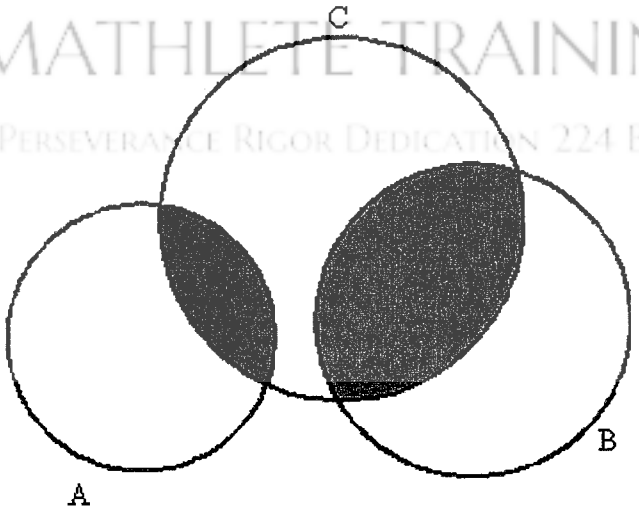
27. (SMOPS 01Q27) A bus was scheduled to travel from Town X to Town Y at a constant speed V km/h. If the speed of the bus was increased by 20%, it could arrive at Town Y 1 hour ahead of schedule. Instead, if the bus travelled the first 120km at V km/h and then the speed was increased by 25%, it could arrive at town Y $\frac{4}{5}$ hours ahead of schedule. Find the distance between the two towns.

28. (SMOPS 01Q28) The diagram shows three circles A,B and C.

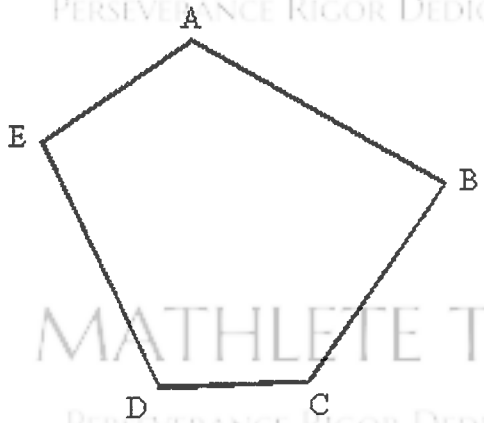
$\frac{1}{3}$ of the circle A is shaded,
$\frac{1}{2}$ of the circle B is shaded,
$\frac{1}{4}$ of the circle C is shaded.

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. (SMOPS 01Q29) Given that $m = \underbrace{999\ldots999}_{2001\text{digits}}$, $n = \underbrace{888\ldots888}_{2001\text{digits}}$, find the sum of the digits in the value of $m \times n$.

30. (SMOPS 01Q30) 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?



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