Group1

SAMPLE Place the five numbers 21, 29, 28, 31 and 19 in the squares in such a way that the following would be true:

What is the sum of the numbers in the shaded squares?

SAMPLE I have 17 roses – white, yellow and red. The white and yellow roses together are 10, the yellow and red roses together are 10. How many yellow roses are there?

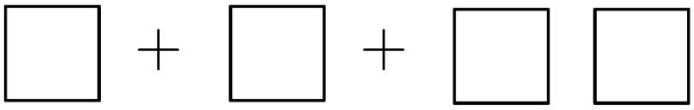
Ⓐ 7 Ⓑ 3 Ⓒ 1

SAMPLE What is the smallest possible sum of the numbers that we would need to place in the 6 empty squares, so that the sum of the numbers in order of rows, diagonals, and columns would be the same?

	2	
		2
2		

Group2

SAMPLE Place the digits 1, 2, 3 and 4 in the squares in a way that would result in the greatest sum.



What is the sum?

SAMPLE Peter solved 3 problems, Iva solved 2 problems less than Peter; Mary solved one problem more than Iva. How many problems did Mary solve?

SAMPLE I used 44 digits to write down

$$67891011...202122...x,$$

where x is a two-digit number. What is the number x?

Group3

SAMPLE What are the last 2 digits of the sum

$$\underbrace{1+2+2+3+3+3+4+4+4+4+\cdots+9}_{45 \text{ addends}}$$

SAMPLE In Rose's garden there are 232 roses which are not in bloom yet and 168 which are blooming. Every day 4 new roses bloom and the ones that are already blooming do not fade. How many days will it take for the blossoming and non-blossoming roses to be an equal number?

SAMPLE The sum of the three-digit numbers $\overline{32A}$, $\overline{5B6}$ and $\overline{C11}$ is 1010.(A, B and C represent missing numbers). In this case, what is the three-digit number $\overline{ABC}$?

Group4

SAMPLE In $A+\overline{AB}=\overline{CDE}$ each letter corresponds to a digit. Identical letters correspond to identical digits and different letters correspond to different numbers. What is the greatest possible number that corresponds to $\overline{ABCDE}$?

SAMPLE Bugs Bunny decided to eat only carrots for the week. He ate a different number of carrots each day, but he didn't eat more than 7 on any day. How many carrots did Bugs Bunny eat during that week?

SAMPLE There are several points along a straight line. A student placed a point between every two adjacent points. After doing this 5 times, there were now 33 points along the straight line. How many points were originally on the straight line (before the student placed any extra points)?

Group5

SAMPLE Find the difference of the smallest number that is greater than $2,016$ and has the same sum of its digits as $2,016$, and the number $2,016$.

SAMPLE Town A and Town B are 435km apart. At $9:15$ a.m, a car left Town A and travel towards Town B at a constant speed of 80km/h. At the same time, a lorry left B and travelled towards Town A at a constant speed. When they met, the car travelled a distance of 240km. Find the speed of the lorry.

SAMPLE How many odd natural numbers that are smaller than 15 can be presented as a sum of two prime numbers?

(*Hint: A prime number is a number, larger than 1, that can only be divided evenly by itself and 1. For example:* $2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, ...$)

Group6

SAMPLE Find the tens digit of the value of the expression

$$\frac{4 \times 5 \times 6 \times 7 \times \ldots \times 24 \times 25}{5 \times 5 \times 5 \times 5}$$

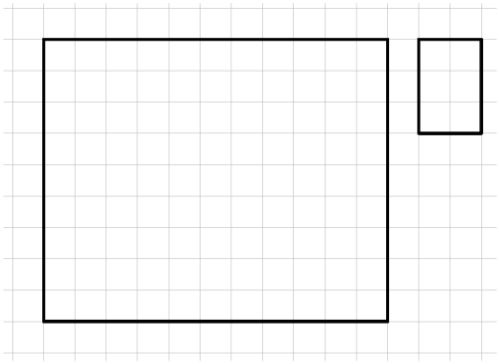
SAMPLE A rectangular sheet of size 3 cm by 4 cm is cut into squares with side lengths that are whole numbers. If the sheet is cut into the smallest possible number of squares, how many squares of side length 1 cm are there?

SAMPLE The number $\overline{12a34a56a78a}$ consists of 12 digits $(1, 2, 3, \ldots, 8)$ and the number a is included 4 times, and it is divisible by 36. What is the digit a?

Group7

SAMPLE If $A = \left|2^N - 3\right| - \left|4 - 2^N\right|$, where N is a positive integer, what is the smallest value of A?

SAMPLE You can see a rectangle with a size of 11×9 cm. What is the maximum number of smaller rectangles with sizes of 3×2 cm we can form out of the big rectangle?



SAMPLE What is the three-digit number abc for which the equality is true

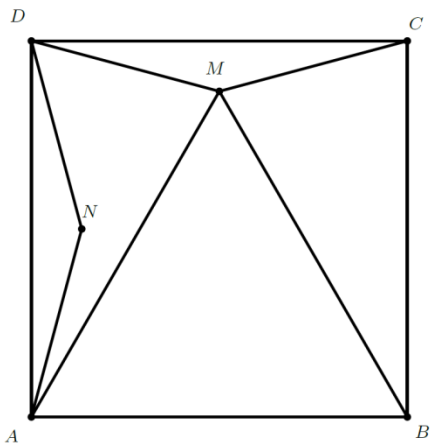
$$\overline{abc} = \overline{ab} + \overline{bc} + \overline{ca}?$$

Group8

SAMPLE The numbers 0, 1, 2, 3, 4 and 5 have been used to write down all four-digit numbers that have no repeated digits and are divisible by 5. What part of these numbers are divisible by 10?

SAMPLE There are X points marked on a circumference, 5 of which are red, and the rest are blue. Each two of the points are connected by a segment. If the number of segments with two red ends is equal to the number of segments with different-colored ends, how much is X?

SAMPLE The isosceles triangles AND and CDM have been built on the sides of the square $ABCD$. If $\angle AND = \angle CMD = 150°$, then calculate $\angle AMB$.



Group9

SAMPLE If $a = \sqrt{3} - 2$ and $b = -\sqrt{3} - 2$, then the value of $(a + 2|a|)(b - |b|)$ is:

Ⓐ -2 Ⓑ 2 Ⓒ $\sqrt{3}$ Ⓓ $-\sqrt{3}$

SAMPLE $\triangle ABC$ is an equilateral triangle with sides of length 3 cm. The points M, N and P are respectively found on the sides BA, AC and CB, and are such that $MN \perp AC, NP \perp CB$ and $PM \perp AB$. Calculate the length of the segment AM.

SAMPLE Find the smallest natural number N, for which the expression $A - N$ is divisible by 10.

$$A = \underbrace{3^1 \times 3^2 \times \ldots \times 3^{19} \times 3^{20}}_{\text{20 multipliers}}$$

Answer

	SAMPLE 1	SAMPLE 2	SAMPLE 3
Group1	50	B	3
Group2	46	2	29
Group3	85	8	371
Group4	98107	28	2
Group5	9	65	4
Group6	0	3	0
Group7	-1	16	198
Group8	5/9	7	60°
Group9	A	2	9