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Po Leung Kuk

10^{th} Primary Mathematics World Contest

Individual Contest 2006

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1. Lily plans to spend all of her \$31 to buy different types of pens that cost \$2, \$3 and \$4 respectively. If she wants to buy at least 1 pen of each type, what is the maximum number of pens that she can buy?

2. a, b and c are two-digit numbers. The unit digit of a is 7, the unit digit of b is 5 and the tens digit of c is 1. If $a \times b + c = 2006$, find the value of $a + b + c$.

3. A class of students bought and equally distributed a certain number of notebooks. If the notebooks are distributed to girls only, each girl will receive 15 notebooks. If the notebooks are distributed to boys only, each boy will receive 10 notebooks. If the notebooks are equally distributed to everyone in the class, how many notebooks will each student receive?

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4. The lengths of two sides of a triangle are 2006 and 6002 units respectively. If the length, in the same units, of the third side of this triangle is an integer, how many different triangles can exist?

5. We have four cards numbered 1, 2, 3 and 4 respectively. Three of the four cards are placed into the boxes as shown in the equation below.

$$n = 5 + \square + \square - \square$$

How many different values of n can be obtained?

6. Solly wants to unlock his friend Koos's combination lock. The lock consists of 4 reels, each reel displays the digits from 1 to 9. Koos tells Solly that the first digit from left to right is a multiple of 3, the second digit is a prime, the third digit is a multiple of 2 and the whole number is divisible by 4. For example,

6	7	8	8

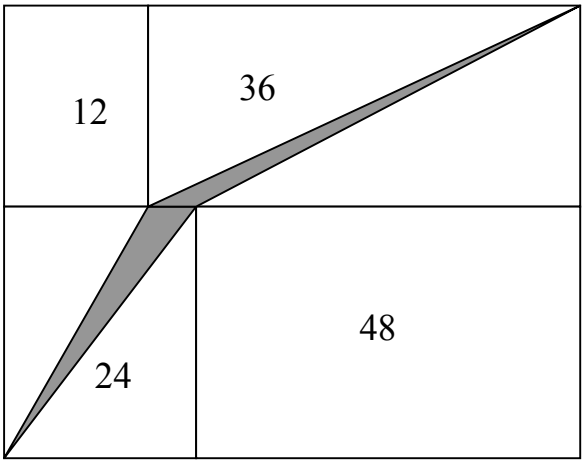
By following Koos' clues, what is the maximum possible number of different ways that Solly can unlock it?

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7. There are over 50 children sitting in a circle. They count clockwise around the circle starting from 1. If the same child has counted 2 and 2006, what is the least number of children in the circle?

8. If the number $\overbrace{20062006\cdots2006}^{n \text{ such '2006'}}01$ is divisible by 11, what is the minimum value of n ?

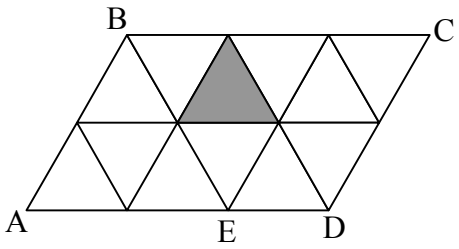
9. As shown in the figure below, the big rectangle consists of four smaller rectangles with their areas 12cm^2, 24cm^2, 36cm^2 and 48cm^2 respectively. If all the lengths, in cm, of the rectangles are integers, what is the area of the shaded region?



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10. N is a natural number such that when divided by 10 it leaves the remainder 9, when divided by 9 it leaves the remainder 8, when divided by 8 it leaves the remainder 7, ..., when divided by 2 it leaves the remainder 1. Find the smallest value of N.

11. $ABCD$ is a parallelogram that is made up of 12 identical triangles as shown. The lines in the figure are parallel to either AB, AD or BE. How many different parallelograms are there which include the shaded triangle?



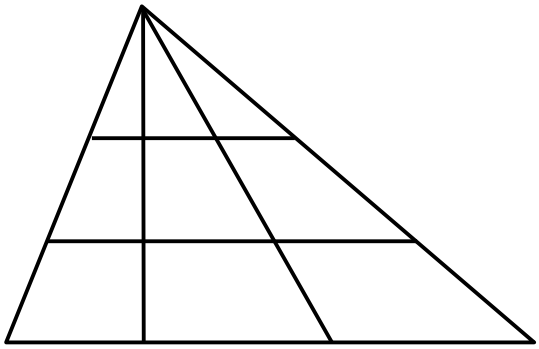
12. Find the unit digit of the sum:

$$1^{2006} + 2^{2006} + 3^{2006} + \ldots + 8^{2006} + 9^{2006}$$

13. On a true / false test of 100 items, every item number that is a multiple of 4 is true, and all others are false. If a student marks every item that is a multiple of 3 false and all others true, how many of the 100 items will be correctly answered?

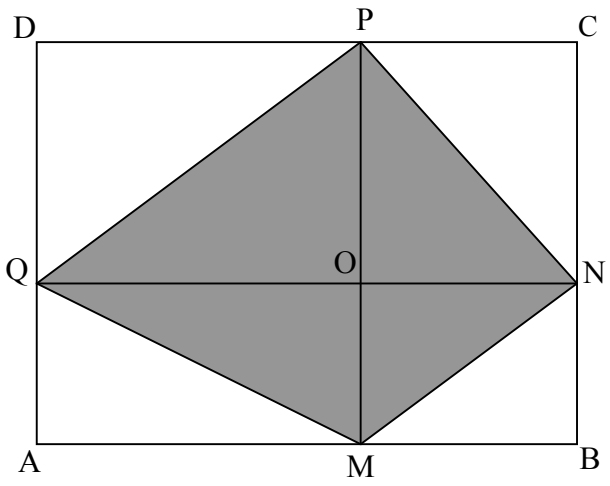
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14. The figure shown is formed by seven line segments.



What is the total number of triangles in the figure?

15. In the following figure, *AMOQ*, *MBNO*, *ONCP*, *QOPD* and *ABCD* are rectangles. If the area of *QOPD* is 51 square units, the area of *ONCP* is 17 square units and the area of *MBNO* is 29 square units, find the area of the quadrilateral *MNPQ***.**



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