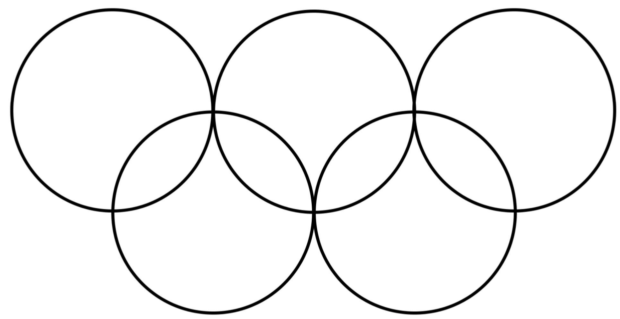
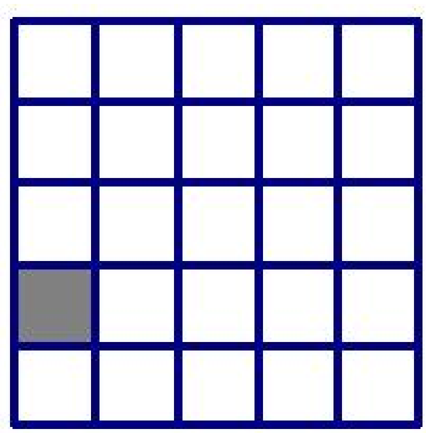
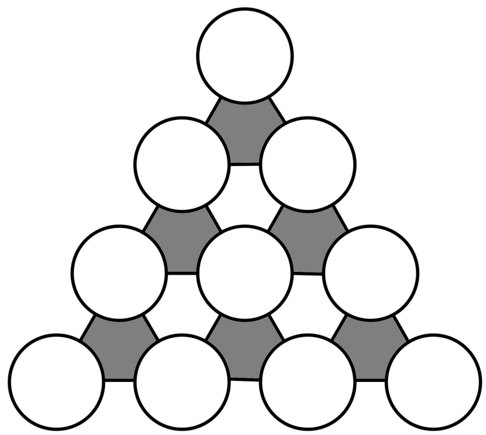
76. How many possible solutions are there in arranging the digits 1 to 9 into each closed area so that the sum of the digits inside every circle is the same. Each closed area contains only one digit and no digits are repeated. Draw all possible solutions.



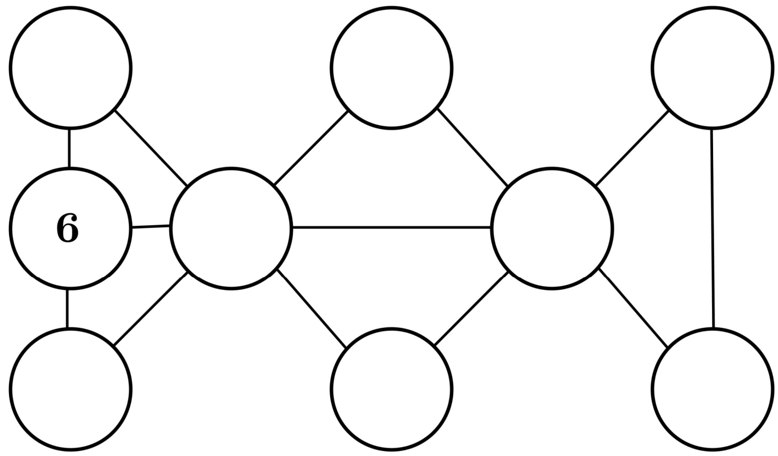
77. A frog is sitting on a square adjacent to a corner square of a 5×5 board. It hops from square to adjacent square, horizontally or vertically, but not diagonally. Prove that it cannot visit each square exactly once.



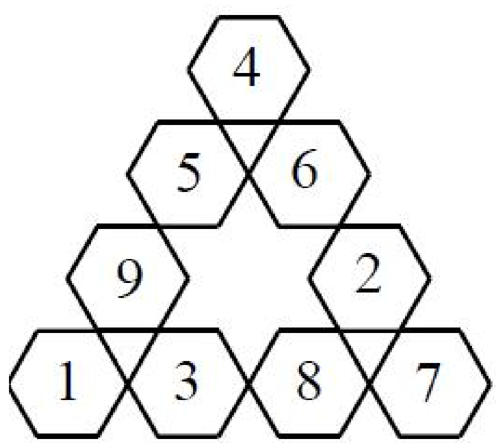
78. Place the numbers 0 through 9 in the circles in the diagram below without repetition, so that in each of the six small triangles pointing up (shaded triangles), the sum of the numbers in the vertices is the same.



79. Each of the nine circles in the diagram below contains a different positive integer. These integers are consecutive and the sum of the numbers on each of the seven lines is 23. The number in the circle at the top right corner is less than the number in the circle at the bottom right corner. Eight numbers have been erased. Restore them.



80. In the diagram below, the numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9 are placed one inside each hexagon, so that the sum of the numbers along each of the three sides of the triangle is 19. If you are allowed to rearrange the numbers but still have to keep the sum along the sides equal (can be different from 19), what is the smallest possible sum and what is the largest possible sum?



81. Place the digits 1 to 6 in the grid so that no digit is repeated in a row, column or diagonal.

2			1		
					4
	2				
				6	
		5			1
3					

82. An cut the pizza into n equal slices and then she labelled them with numbers $1, 2, \ldots, n$ (she used each number exactly once). The numbering had the property that between each two slices with consecutive numbers (i and $i+1$) there was always the same number of other slices. Then came Binh the glutton and ate almost the whole pizza, leaving only the three neighbouring slices with the numbers $11, 4,$ and 17 (in this exact order) on them. How many slices did the pizza have?

83. In one of the lecture halls at Hanoi city the seats are arranged in a rectangular grid. During the lecture of

geometry there were exactly 11 boys in each row and exactly 3 girls in each column. Moreover, two seats were empty. What is the smallest possible number of the seats in the lecture hall?

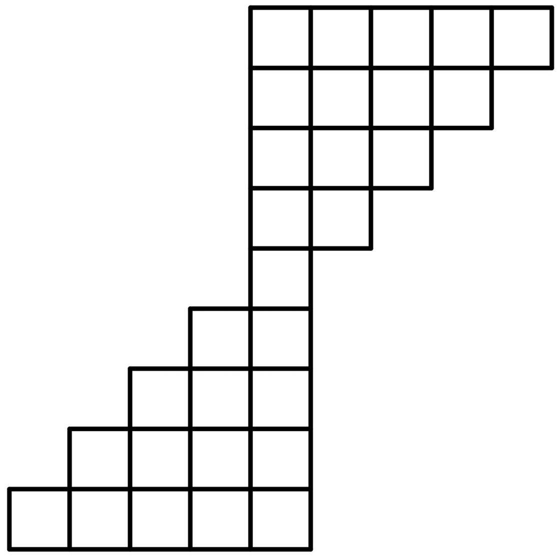
84. Vinh thought of three distinct positive integers a, b, c such that the sum of two of them was 800. When he wrote numbers a, b, c, $a+b-c$, $a+c-b$, $b+c-a$ and $a+b+c$ on a sheet of paper, he realized that all of them were primes. Determine the difference between the largest and the smallest numbers on Vinh's paper.

85. A polynomial $P(x)$ of degree 2015 with real coefficients such that $P(n) = 3^n$ for all $n = 0, 1, \dots, 2015$. Evaluate $P(2016)$.

86. In an isosceles triangle ABC, fulfilling $AB = AC$ and $\angle BAC = 99.4^\circ$, a point D is given such that $AD = DB$ and $\angle BAD = 19.7^\circ$. Compute $\angle BDC$

87. There are 29 unit squares in the diagram below. A frog starts in one of the five (unit) squares in the bottom row. Each second, it jumps either to the square directly above its current position (if such a square exists), or to the square that is one above and one to the right from its current square (if such

a square exists). The frog jumps every second until it reaches the top. How many distinct paths can it take from the bottom to the top row?



88. If sides a, b, c of a triangle satisfy

$$\frac{3}{a+b+c} = \frac{1}{a+b} + \frac{1}{a+c},$$

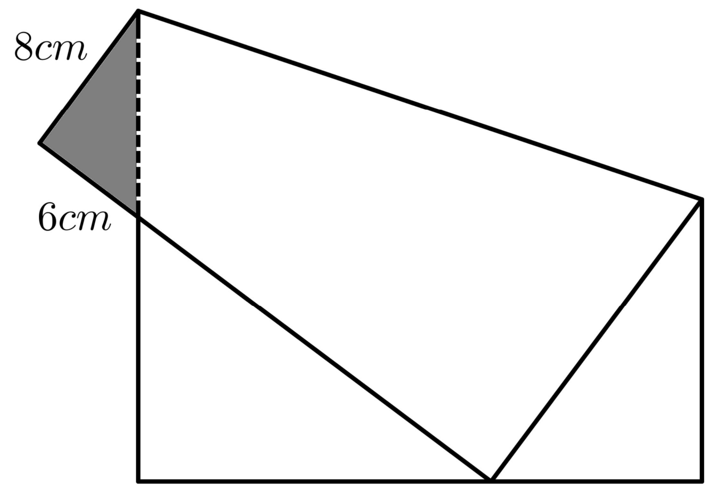
what is the angle between sides b and c?

89. Consider a number that starts with 122333444455555... and continues in such a way that we write each positive integer as many times as its value indicates. We stop after writing 2016 digits. What is the last digit of this number?

90. I chose two numbers from the set $\{1, 2, \ldots, 9\}$. Then I told An their product and Binh their sum. The following conversation ensued:
An: *"I don't know the numbers."*
Binh: *"I don't know the numbers."*
An: *"I don't know the numbers."*
Binh: *"I don't know the numbers."*
An: *"I don't know the numbers."*
Binh: *"I don't know the numbers."*
An: *"I don't know the numbers."*
Binh: *"I don't know the numbers."*
An: *"Now I know the numbers."*

What numbers did I choose?

91. A square sheet of paper is folded so that one of its vertices is precisely on one of the sides. As in the picture, there is a small triangle formed where the paper does not overlap. The length of its outer side that is adjacent to the line of the folding is 8 cm, and the length of the other outer side is 6 cm. What is the side length of the paper?



92. There are $n > 24$ women sitting around a great round table, each of whom either always lies or always tells the truth. Each woman claims the following:
    She is truthful.
    The person sitting twenty four seats to her right is a liar.
    Find the smallest n for which this is possible.

93. Ten people - five women and their husbands - took part in E events. We know that no married couple took part in the same event, every possible pair of non-married people (including same-sex pairs) took part in exactly one event together, and one person attended only two events. What is the smallest E for which this is possible?

94. Find n, the number of positive integers not exceeding 1000 such that the number $\lfloor \sqrt[3]{n} \rfloor$ is a divisor of n. Note: The symbol $\lfloor x \rfloor$denotes the integral part of x, i.e. the greatest integer not exceeding x.

95. A sequence (a_n) is given by $a_1 = 1$, and $a_n = \lfloor \sqrt{a_1 + a_2 + \cdots + a_{n-1}} \rfloor$ for $n > 1$. Determine a_{1000}. Note: The symbol $\lfloor x \rfloor$ denotes the integral part of x, i.e. the greatest integer not exceeding x.

96. Let (α, β) be an open interval, with $\beta - \alpha = \dfrac{1}{2016}$. Determine the maximum number of irreducible fractions $\dfrac{a}{b} \in (\alpha, \beta)$ with $1 \leq b \leq 2016$?

97. Let $p = \overline{abc}$ be a three-digit prime number. Prove that the equation $ax^2 + bx + c = 0$ has no rational roots.

98. How many integers belong to $(a, 2016a)$, where a $(a > 0)$ is a given real number?

99. Given an array of number $A = \{672; 673; \ldots; 2016\}$ on table. Three arbitrary numbers $a, b, c \in A$ are step by step replaced by number $\dfrac{1}{3}\min\{a, b, c\}$. After 672 times, on the table there is only one number m. Prove that $m < 1$.

100. Let n be a positive integer and $P(n)$ the product of the non-zero digits of n. Find the largest prime divisor of the number

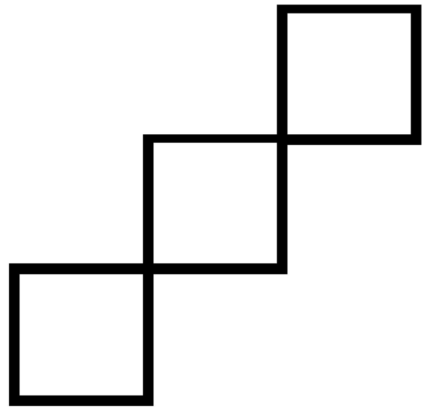
$$P(1) + P(2) + P(3) + \cdots + P(999).$$

101. There is a group of 30 people where everyone is familiar with at least 25 others. Prove that there exists a group of at least 6 people who know each other. Would this hold true for 7 people?

102. A 13×13 checkerboard's middle square is missing. Prove that the board cannot be paved with 1×4 rectangles (there can be no overlap).

103. There is a 5×5 checkerboard filled by white or black squares. Prove that there exist four unit squares of the same colour that are at the intersection of two columns and two rows.

104. What is the largest number of below shape can you cut from an 8×8 checkerboard?
"Note: each shape covers exactly three unit squares of the checkerboad".



105. Is it possible to build a $8 \times 8 \times 9$ cuboid from 32 pieces of smaller $2 \times 3 \times 3$ cuboids?

106. A $6 \times 6 \times 6$ cube consists of 216 small $1 \times 1 \times 1$ cubes. In how many ways can we pair two small cubes so that they have at most 2 vertices in common?

107. We know that any triangle can be cut into four smaller congruent triangles. On the other hand, can we cut any triangle into four similar, but not all congruent triangles?

108. Let us choose arbitrarily n vertices of a regular $2n-gon$ and colour them red. Remaining vertices are coloured blue. We arrange all red-red distances into a nondecreasing sequence and do the same with blue-blue distances. Prove that the sequences are equal.

Xin chân thành cám ơn sự quan tâm và những ý kiến đóng góp của bạn đọc!