PROBLEMA 1
Find all prime numbers p for which there exist positive integers x, y, and z such that the number $x^p+y^p+z^p-x-y-z$ is a product of exactly three distinct prime numbers.

PROBLEMA 2
Let a, b be two distinct real numbers and let c be a positive real numbers such that$a^4 - 2019a = b^4 - 2019b = c$. Prove that $-\sqrt{c} < ab < 0$.

PROBLEMA 3
Triangle ABC is such that $AB < AC$. The perpendicular bisector of side BC intersects lines AB and AC at points P and Q, respectively. Let H be the orthocentre of triangle ABC, and let M and N be the midpoints of segments BC and PQ, respectively. Prove that lines HM and AN meet on the circumcircle of ABC.

PROBLEMA 4
A 5×100 table is divided into 500 unit square cells, where n of them are coloured black and the rest are coloured white. Two unit square cells are called adjacent if they share a common side. Each of the unit square cells has at most two adjacent black unit square cells. Find the largest possible value of n.

PROBLEMA 1
Find all integers m and n such that the fifth power of m minus the fifth power of n is equal to $16mn$.

PROBLEMA 2
Find max number n of numbers of three digits such that :

1. Each has digit sum 9
2. No one contains digit 0
3. Each 2 have different unit digits
4. Each 2 have different decimal digits
5. Each 2 have different hundreds digits

PROBLEMA 3
Let $k > 1$ be a positive integer and $n > 2018$ an odd positive integer. The non-zero rational numbers $x_1, x_2, \dots, x_n$ are not all equal and:

$$x_1 + \frac{k}{x_2} = x_2 + \frac{k}{x_3} = x_3 + \frac{k}{x_4} = \dots = x_{n-1} + \frac{k}{x_n} = x_n + \frac{k}{x_1}$$

Find the minimum value of k, such that the above relations hold.

PROBLEMA 4
Let $\triangle ABC$ and A',B',C' the symmetrics of vertex over opposite sides.The intersection of the circumcircles of $\triangle ABB'$ and $\triangle ACC'$ is A_1.B_1 and C_1 are defined similarly.Prove that lines AA_1,BB_1 and CC_1 are concurent.

PROBLEMA 1
Determine all the sets of six consecutive positive integers such that the product of some two of them . added to the product of some other two of them is equal to the product of the remaining two numbers.

PROBLEMA 2
Let x, y, z be positive integers such that $x \neq y \neq z \neq x$ .Prove that

$$(x+y+z)(xy+yz+zx-2) \geq 9xyz.$$

When does the equality hold?Proposed by Dorlir Ahmeti, Albania

PROBLEMA 3
Let ABC be an acute triangle such that $AB \neq AC$,with circumcircle Γ and circumcenter O. Let M be the midpoint of BC and D be a point on Γ such that $AD \perp BC$. let T be a point such that $BDCT$ is a parallelogram and Q a point on the same side of BC as A such that $\angle BQM = \angle BCA$ and $\angle CQM = \angle CBA$. Let the line AO intersect Γ at E $(E \neq A)$ and let the circumcircle of $\triangle ETQ$ intersect Γ at point $X \neq E$. Prove that the point A, M and X are collinear .
JBMO 2017, Q3

PROBLEMA 4
Consider a regular 2n-gon P, $A_1, A_2, \cdots, A_{2n}$ in the plane, where n is a positive integer. We say that a point S on one of the sides of P can be seen from a point E that is external to P, if the line segment SE contains no other points that lie on the sides of P except S. We color the sides of P in 3 different colors (ignore the vertices of P, we consider them colorless), such that every side is colored in exactly one color, and each color is used at least once. Moreover, from every point in the plane external to P, points of most 2 different colors on P can be seen. Find the number of distinct such colorings of P (two colorings are considered distinct if at least one of sides is colored differently).

PROBLEMA 1

Seja $ABCD$ um trapézio ($AB \parallel CD$, $AB > CD$) circunscrito na circunferência ω, isto é, ω é tangente à AB, BC, CD e DA. O incírculo de ABC toca AB e AC nos pontos M e N, respectivamente.

Prove que o incentro $ABCD$ cai na reta MN.

PROBLEMA 2

Let a, b, cbe positive real numbers.Prove that $\frac{8}{(a+b)^2+4abc} + \frac{8}{(b+c)^2+4abc} + \frac{8}{(a+c)^2+4abc} + a^2 + b^2 + c^2 \geq \frac{8}{a+3} + \frac{8}{b+3} + \frac{8}{c+3}$.

PROBLEMA 3

Find all triplets of integers (a, b, c) such that the number

$$N = \frac{(a-b)(b-c)(c-a)}{2} + 2$$

is a power of 2016.

(A power of 2016 is an integer of form 2016^n,where n is a non-negative integer.)

PROBLEMA 4

A 5×5

table is called regular f each of its cells contains one of four pairwise distinct real numbers,such that each of them occurs exactly one in every 2×2

subtable.The sum of all numbers of a regular table is called the total sum of the table.With any four numbers,one constructs all possible regular tables,computes their total sums and counts the distinct outcomes.Determine the maximum possible count.

PROBLEMA 1
Find all prime numbers a, b, c and positive integers k satisfying the equation

$$a^2 + b^2 + 16c^2 = 9k^2 + 1.$$

Proposed by Moldova

PROBLEMA 2
Let a, b, c be positive real numbers such that $a + b + c = 3$. Find the minimum value of the expression

$$A = \frac{2 - a^3}{a} + \frac{2 - b^3}{b} + \frac{2 - c^3}{c}.$$

PROBLEMA 3
Let ABC be an acute triangle.The lines l_1 and l_2 are perpendicular to AB at the points A and B, respectively.The perpendicular lines from the midpoint M of AB to the lines AC and BC intersect l_1 and l_2 at the points E and F, respectively.If D is the intersection point of the lines EF and MC, prove that

$$\angle ADB = \angle EMF.$$

PROBLEMA 4
An L-shape is one of the following four pieces, each consisting of three unit squares:[asy]
size(300);
defaultpen(linewidth(0.8));
path P=(1,2)–(0,2)–origin–(1,0)–(1,2)–(2,2)–(2,1)–(0,1);
draw(P);
draw(shift((2.7,0))*rotate(90,(1,1))*P);
draw(shift((5.4,0))*rotate(180,(1,1))*P);
draw(shift((8.1,0))*rotate(270,(1,1))*P);
[/asy]
A 5×5 board, consisting of 25 unit squares, a positive integer $k \leq 25$
and an unlimited supply of L-shapes are given. Two players A and B,
play the following game: starting with A they play alternatively mark a
previously unmarked unit square until they marked a total of k unit squares.

We say that a placement of L-shapes on unmarked unit squares is called *good* if the L-shapes do not overlap and each of them covers exactly three unmarked unit squares of the board.

B wins if every *good* placement of L-shapes leaves uncovered at least three unmarked unit squares. Determine the minimum value of k for which B has a winning strategy.

PROBLEMA 1
Find all triples of primes (p, q, r) satisfying $3p^4 - 5q^4 - 4r^2 = 26$.

PROBLEMA 2
Consider an acute triangle ABC of area S. Let $CD \perp AB$ ($D \in AB$), $DM \perp AC$ ($M \in AC$) and $DN \perp BC$ ($N \in BC$). Denote by H_1 and H_2 the orthocentres of the triangles MNC, respectively MND. Find the area of the quadrilateral AH_1BH_2 in terms of S.

PROBLEMA 3
For positive real numbers a, b, c with $abc = 1$ prove that $\left(a + \frac{1}{b}\right)^2 + \left(b + \frac{1}{c}\right)^2 + \left(c + \frac{1}{a}\right)^2 \geq 3(a + b + c + 1)$

PROBLEMA 4
For a positive integer n, two payers A and B play the following game: Given a pile of s stones, the players take turn alternatively with A

going first. On each turn the player is allowed to take either one

stone, or a prime number of stones, or a positive multiple of n stones. The winner is the one who takes the last stone. Assuming both A and B play perfectly, for how many values of s the player A cannot win?

PROBLEMA 1

Find all ordered pairs (a, b) of positive integers for which the numbers $\dfrac{a^3b-1}{a+1}$ and $\dfrac{b^3a+1}{b-1}$ are both positive integers.

PROBLEMA 2

Let ABC be an acute-angled triangle with $AB < AC$ and let O be the centre of its circumcircle ω. Let D be a point on the line segment BC such that $\angle BAD = \angle CAO$. Let E be the second point of intersection of ω and the line AD. If M, N and P are the midpoints of the line segments BE, OD and AC, respectively, show that the points M, N and P are collinear.

PROBLEMA 3

Show that

$$\left(a+2b+\frac{2}{a+1}\right)\left(b+2a+\frac{2}{b+1}\right) \geq 16$$

for all positive real numbers a and b such that $ab \geq 1$.

PROBLEMA 4

Let n be a positive integer. Two players, Alice and Bob, are playing the following game:

- Alice chooses n real numbers; not necessarily distinct.

- Alice writes all pairwise sums on a sheet of paper and gives it to Bob. (There are $\frac{n(n-1)}{2}$ such sums; not necessarily distinct.)

- Bob wins if he finds correctly the initial n numbers chosen by Alice with only one guess.

Can Bob be sure to win for the following cases?

a. $n = 5$

b. $n = 6$

c. $n = 8$

Justify your answer(s).

[For example, when $n = 4$,
Alice may choose the numbers 1, 5, 7, 9, which have the same pairwise
sums as the numbers 2, 4, 6, 10, and hence Bob cannot be sure to win.]

PROBLEMA 1
Let a, b, c be positive real numbers such that $a+b+c=1$. Prove that

$$\frac{a}{b}+\frac{a}{c}+\frac{c}{b}+\frac{c}{a}+\frac{b}{c}+\frac{b}{a}+6 \geq 2\sqrt{2}\left(\sqrt{\frac{1-a}{a}}+\sqrt{\frac{1-b}{b}}+\sqrt{\frac{1-c}{c}}\right).$$

When does equality hold?

PROBLEMA 2
Let the circles k_1 and k_2 intersect at two points A and B, and let t be a common tangent of k_1 and k_2 that touches k_1 and k_2 at M and N respectively. If $t \perp AM$ and $MN = 2AM$, evaluate the angle NMB.

PROBLEMA 3
On a board there are n nails, each two connected by a rope. Each rope is colored in one of n given distinct colors. For each three distinct colors, there exist three nails connected with ropes of these three colors.

a) Can n be 6 ?
b) Can n be 7 ?

PROBLEMA 4
Find all positive integers x, y, z and t such that $2^x 3^y + 5^z = 7^t$.

PROBLEMA 1
Let a, b, c be positive real numbers such that $abc = 1$. Prove that: $\prod(a^5+a^4+a^3+a^2+a+1) \geq 8(a^2+a+1)(b^2+b+1)(c^2+c+1)$

PROBLEMA 2
Find all primes p such that there exist positive integers x, y that satisfy $x(y^2-p)+y(x^2-p)=5p$

PROBLEMA 3
Let $n > 3$ be a positive integer. Equilateral triangle ABC is divided into n^2 smaller congruent equilateral triangles (with sides parallel to its sides). Let m be the number of rhombuses that contain two small equilateral triangles and d the number of rhombuses that contain eight small equilateral triangles. Find the difference $m-d$ in terms of n.

PROBLEMA 4
Let $ABCD$ be a convex quadrilateral and points E and F on sides AB, CD such that

$$\frac{AB}{AE} = \frac{CD}{DF} = n$$

If S is the area of $AEFD$ show that $S \leq \frac{AB \cdot CD + n(n-1)AD^2 + n^2 DA \cdot BC}{2n^2}$

PROBLEMA 1
The real numbers a, b, c, d satisfy simultaneously the equations

$$abc - d = 1, \quad bcd - a = 2, \quad cda - b = 3, \quad dab - c = -6.$$

Prove that $a + b + c + d \neq 0$.

PROBLEMA 2
Find all integers n, $n \geq 1$, such that $n \cdot 2^{n+1} + 1$ is a perfect square.

PROBLEMA 3
Let AL and BK be angle bisectors in the non-isosceles triangle ABC (L lies on the side BC, K lies on the side AC). The perpendicular bisector of BK intersects the line AL at point M. Point N lies on the line BK such that LN is parallel to MK. Prove that $LN = NA$.

PROBLEMA 4
A 9×7 rectangle is tiled with tiles of the two types: L-shaped tiles composed by three unit squares (can be rotated repeatedly with $90°$) and square tiles composed by four unit squares.

Let $n \geq 0$ be the number of the 2×2 tiles which can be used in such a tiling. Find all the values of n.

PROBLEMA 1
Let $ABCDE$ be a convex pentagon such that $AB + CD = BC + DE$ and k a circle with center on side AE that touches the sides AB, BC, CD and DE at points P, Q, R and S (different from vertices of the pentagon) respectively. Prove that lines PS and AE are parallel.

PROBLEMA 2
Solve in non-negative integers the equation $2^a 3^b + 9 = c^2$

PROBLEMA 3
Let x, y, z be real numbers such that$0 < x, y, z < 1$ and $xyz = (1 - x)(1 - y)(1 - z)$. Show that at least one of the numbers $(1 - x)y, (1 - y)z, (1 - z)x$ is greater than or equal to $\frac{1}{4}$.

PROBLEMA 4
Each one of 2009 distinct points
in the plane is coloured in blue or red, so that on every blue-centered unit circle there are exactly two red points. Find the gratest possible number of blue points.

PROBLEMA 1
Find all real numbers a, b, c, d such that

$$\begin{cases} a+b+c+d=20, \\ ab+ac+ad+bc+bd+cd=150. \end{cases}$$

PROBLEMA 2
The vertices A and B of an equilateral triangle ABC lie on a circle k of radius 1, and the vertex C is in the interior of the circle k. A point D, different from B, lies on k so that $AD = AB$. The line DC intersects k for the second time at point E. Find the length of the line segment CE.

PROBLEMA 3
Find all prime numbers p, q, r, such that $\frac{p}{q} - \frac{4}{r+1} = 1$

PROBLEMA 4
A 4×4 table is divided into 16 white unit square cells. Two cells are called neighbors if they share a common side. A move consists in choosing a cell and the colors of neighbors from white to black or from black to white. After exactly n moves all the 16 cells were black. Find all possible values of n.

PROBLEMA 1
Let a be positive real number such that $a^3 = 6(a+1)$. Prove that the equation $x^2 + ax + a^2 - 6 = 0$ has no real solution.

PROBLEMA 2
Let $ABCD$ be a convex quadrilateral with $\angle DAC = \angle BDC = 36^\circ$, $\angle CBD = 18^\circ$ and $\angle BAC = 72^\circ$. The diagonals and intersect at point P . Determine the measure of $\angle APD$.

PROBLEMA 3
Given are 50
points in the plane, no three of them belonging to a same line. Each of
these points is colored using one of four given colors. Prove that
there is a color and at least 130 scalene triangles with vertices of that color.

PROBLEMA 4
Prove that if p is a prime number, then $7p + 3^p - 4$ is not a perfect square.

PROBLEMA 1
If $n > 4$ is a composite number, prove that $2n$ divides $(n-1)!$.

PROBLEMA 2
The triangle ABC is isosceles with $AB = AC$, and $\angle BAC < 60^\circ$. The points D and E are chosen on the side AC such that, $EB = ED$, and $\angle ABD \equiv \angle CBE$. Denote by O the intersection point between the internal bisectors of the angles $\angle BDC$ and $\angle ACB$. Compute $\angle COD$.

PROBLEMA 3
We call a number perfect if the sum of its positive integer divisors(including 1 and n) equals $2n$. Determine all perfect numbers n for which $n-1$ and $n+1$ are prime numbers.

PROBLEMA 4
Consider a $2n \times 2n$ board. From the ith line we remove the central $2(i-1)$ unit squares. What is the maximal number of rectangles 2×1 and 1×2 that can be placed on the obtained figure without overlapping or getting outside the board?

PROBLEMA 1
Find all positive integers x, y satisfying the equation

$$9(x^2 + y^2 + 1) + 2(3xy + 2) = 2005.$$

PROBLEMA 2
Let ABC be an acute-angled triangle inscribed in a circle k. It is given that the tangent from A to the circle meets the line BC at point P. Let M be the midpoint of the line segment AP and R be the second intersection point of the circle k with the line BM. The line PR meets again the circle k at point S different from R.

Prove that the lines AP and CS are parallel.

PROBLEMA 3
Prove that there exist

(a) 5 points in the plane so that among all the triangles with vertices among these points there are 8 right-angled ones;

(b) 64 points in the plane so that among all the triangles with vertices among these points there are at least 2005 right-angled ones.

PROBLEMA 4
Find all 3-digit positive integers $\overline{abc}$ such that

$$\overline{abc} = abc(a + b + c),$$

where $\overline{abc}$ is the decimal representation of the number.

PROBLEMA 1
Prove that the inequality

$$\frac{x+y}{x^2-xy+y^2} \leq \frac{2\sqrt{2}}{\sqrt{x^2+y^2}}$$

holds for all real numbers x and y, not both equal to 0.

PROBLEMA 2
Let ABC be an isosceles triangle with $AC = BC$, let M be the midpoint of its side AC, and let Z be the line through C perpendicular to AB. The circle through the points B, C, and M intersects the line Z at the points C and Q. Find the radius of the circumcircle of the triangle ABC in terms of $m = CQ$.

PROBLEMA 3
If the positive integers x and y are such that $3x + 4y$ and $4x + 3y$ are both perfect squares, prove that both x and y are both divisible with 7.

PROBLEMA 4
Consider a convex polygon having n vertices, $n \geq 4$.

We arbitrarily decompose the polygon into triangles having all the vertices among the vertices of the polygon, such that no two of the triangles have interior points in common. We paint in black the triangles that have two sides that are also sides of the polygon, in red if only one side of the triangle is also a side of the polygon and in white those triangles that have no sides that are sides of the polygon. Prove that there are two more black triangles that white ones.

PROBLEMA 1

Let n be a positive integer. A number A consists of $2n$ digits, each of which is 4; and a number B consists of n digits, each of which is 8. Prove that $A + 2B + 4$ is a perfect square.

PROBLEMA 2

Suppose there are n points in a plane no three of which are collinear with the property that if we label these points as $A_1, A_2, \ldots, A_n$ in any way whatsoever, the broken line $A_1A_2 \ldots A_n$ does not intersect itself. Find the maximum value of n.Dinu Serbanescu, Romania

PROBLEMA 3

Let D, E, F be the midpoints of the arcs BC, CA, AB on the circumcircle of a triangle ABC not containing the points A, B, C, respectively. Let the line DE meets BC and CA at G and H, and let M be the midpoint of the segment GH. Let the line FD meet BC and AB at K and J, and let N be the midpoint of the segment KJ.

a) Find the angles of triangle DMN;

b) Prove that if P is the point of intersection of the lines AD and EF, then the circumcenter of triangle DMN lies on the circumcircle of triangle PMN.

PROBLEMA 4

Let $x, y, z > -1$. Prove that

$$\frac{1+x^2}{1+y+z^2} + \frac{1+y^2}{1+z+x^2} + \frac{1+z^2}{1+x+y^2} \geq 2.$$

PROBLEMA 1
The triangle ABC has $CA = CB$. P is a point on the circumcircle between A and B (and on the opposite side of the line AB to C). D is the foot of the perpendicular from C to PB. Show that $PA + PB = 2 \cdot PD$.

PROBLEMA 2
Two circles with centers O_1 and O_2 meet at two points A and B such that the centers of the circles are on opposite sides of the line AB. The lines BO_1 and BO_2 meet their respective circles again at B_1 and B_2. Let M be the midpoint of B_1B_2. Let M_1, M_2 be points on the circles of centers O_1 and O_2 respectively, such that $\angle AO_1M_1 = \angle AO_2M_2$, and B_1 lies on the minor arc AM_1 while B lies on the minor arc AM_2. Show that $\angle MM_1B = \angle MM_2B$.Ciprus

PROBLEMA 3
Find all positive integers which have exactly 16 positive divisors $1 = d_1 < d_2 < \ldots < d_{16} = n$ such that the divisor d_k, where $k = d_5$, equals $(d_2 + d_4)d_6$.

PROBLEMA 4
Prove that for all positive real numbers a, b, c the following inequality takes place

$$\frac{1}{b(a+b)} + \frac{1}{c(b+c)} + \frac{1}{a(c+a)} \geq \frac{27}{2(a+b+c)^2}.$$

Laurentiu Panaitopol, Romania

PROBLEMA 1
Solve the equation $a^3 + b^3 + c^3 = 2001$ in positive integers.Mircea Becheanu, Romania

PROBLEMA 2
Let ABC be a triangle with $\angle C = 90°$ and $CA \neq CB$. Let CH be an altitude and CL be an interior angle bisector. Show that for $X \neq C$ on the line CL, we have $\angle XAC \neq \angle XBC$. Also show that for $Y \neq C$ on the line CH we have $\angle YAC \neq \angle YBC$.Bulgaria

PROBLEMA 3
Let ABC be an equilateral triangle and D, E points on the sides $[AB]$ and $[AC]$ respectively. If DF, EF (with $F \in AE$, $G \in AD$) are the interior angle bisectors of the angles of the triangle ADE, prove that the sum of the areas of the triangles DEF and DEG is at most equal with the area of the triangle ABC. When does the equality hold?Greece

PROBLEMA 4
Let N be a convex polygon with 1415 vertices and perimeter 2001. Prove that we can find 3 vertices of N which form a triangle of area smaller than 1.

PROBLEMA 1
Let x and y be positive reals such that

$$x^3 + y^3 + (x + y)^3 + 30xy = 2000.$$

Show that $x + y = 10$.

PROBLEMA 2
Find all positive integers $n \geq 1$ such that $n^2 + 3^n$ is the square of an integer.Bulgaria

PROBLEMA 3
A half-circle of diameter EF is placed on the side BC of a triangle ABC and it is tangent to the sides AB and AC in the points Q and P respectively. Prove that the intersection point K between the lines EP and FQ lies on the altitude from A of the triangle ABC.Albania

PROBLEMA 4
At a tennis tournament there were $2n$ boys and n girls participating. Every player played every other player. The boys won $\frac{7}{5}$ times as many matches as the girls. It is knowns that there were no draws. Find n.Serbia

PROBLEMA 1
Let a, b, c, x, y be five real numbers such that $a^3 + ax + y = 0$, $b^3 + bx + y = 0$ and $c^3 + cx + y = 0$. If a, b, c are all distinct numbers prove that their sum is zero.Ciprus

PROBLEMA 2
For each nonnegative integer n we define $A_n = 2^{3n} + 3^{6n+2} + 5^{6n+2}$. Find the greatest common divisor of the numbers $A_0, A_1, \ldots, A_{1999}$.Romania

PROBLEMA 3
Let S be a square with the side length 20 and let M be the set of points formed with the vertices of S and another 1999 points lying inside S. Prove that there exists a triangle with vertices in M and with area at most equal with $\frac{1}{10}$.Yugoslavia

PROBLEMA 4
Let ABC be a triangle with $AB = AC$. Also, let $D \in (BC)$ be a point such that $BC > BD > DC > 0$, and let $\mathcal{C}_1, \mathcal{C}_2$ be the circumcircles of the triangles ABD and ADC respectively. Let BB' and CC' be diameters in the two circles, and let M be the midpoint of $B'C'$. Prove that the area of the triangle MBC is constant (i.e. it does not depend on the choice of the point D).

PROBLEMA 1
Prove that the number $\underbrace{111\ldots11}_{1997}\underbrace{22\ldots22}_{1998}5$ (which has 1997 of 1-s and 1998 of 2-s) is a perfect square.

PROBLEMA 2
Let $ABCDE$ be a convex pentagon such that $AB = AE = CD = 1$, $\angle ABC = \angle DEA = 90°$ and $BC + DE = 1$. Compute the area of the pentagon.

PROBLEMA 3
Find all pairs of positive integers (x, y) such that

$$x^y = y^{x-y}.$$

PROBLEMA 4
Do there exist 16 three digit
numbers, using only three different digits in all, so that the all
numbers give different residues when divided by 16?Bulgaria

PROBLEMA 1
Show that given any 9 points inside a square of side 1 we can always find 3 which form a triangle with area less than $\frac{1}{8}$.Bulgaria

PROBLEMA 2
Let $\frac{x^2+y^2}{x^2-y^2}+\frac{x^2-y^2}{x^2+y^2}=k$. Compute the following expression in terms of k:

$$E(x,y)=\frac{x^8+y^8}{x^8-y^8}-\frac{x^8-y^8}{x^8+y^8}.$$

Ciprus

PROBLEMA 3
Let ABC be a triangle and let I be the incenter. Let N, M be the midpoints of the sides AB and CA respectively. The lines BI and CI meet MN at K and L respectively. Prove that $AI+BI+CI>BC+KL$.

PROBLEMA 4
Determine the triangle with sides a,b,c and circumradius R for which $R(b+c)=a\sqrt{bc}$.Romania

PROBLEMA 1
Problema `math/jbmo/1996/1` não encontrado!

PROBLEMA 2
Problema `math/jbmo/1996/2` não encontrado!

PROBLEMA 3
Problema `math/jbmo/1996/3` não encontrado!

PROBLEMA 4
Problema `math/jbmo/1996/4` não encontrado!

PROBLEMA 1

Problema `math/jbmo/1995/1` não encontrado!

PROBLEMA 2

Problema `math/jbmo/1995/2` não encontrado!

PROBLEMA 3

Problema `math/jbmo/1995/3` não encontrado!

PROBLEMA 4

Problema `math/jbmo/1995/4` não encontrado!

PROBLEMA 1

Problema `math/jbmo/1994/1` não encontrado!

PROBLEMA 2

Problema `math/jbmo/1994/2` não encontrado!

PROBLEMA 3

Problema `math/jbmo/1994/3` não encontrado!

PROBLEMA 4

Problema `math/jbmo/1994/4` não encontrado!

PROBLEMA 1

Problema `math/jbmo/1993/1` não encontrado!

PROBLEMA 2

Problema `math/jbmo/1993/2` não encontrado!

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PROBLEMA 4

Problema `math/jbmo/1993/4` não encontrado!

PROBLEMA 1

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PROBLEMA 3

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PROBLEMA 4

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PROBLEMA 1
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Problema `math/jbmo/1991/3` não encontrado!

PROBLEMA 4
Problema `math/jbmo/1991/4` não encontrado!