

Problem 2.1. Let $S(x)$ be the sum of digits of x . Solve the equation

$$x + S(x) + S(S(x)) = 2018.$$

Problem 2.2. Find the maximum possible value of $x^6 + y^6$ if it's known that $x^2 + y^2 = 1$.

Problem 2.3. Solve the inequality

$$\frac{2x^2 - 5x - 2}{3x - x^2 - 7} \leq 1.$$

Problem 2.4. Let $S(n)$ be the sum of divisors of n (for example $S(6) = 1 + 2 + 3 + 6 = 12$). Find all n for which $S(2n) = 3S(n)$.

Problem 2.5. Is it possible to write numbers (each once) from 1 to 10 on edges and vertices of triangular pyramid in such a way, that any number on the edge is the arithmetical mean of the numbers written on the endpoints of that edge.

Problem 2.6. Let numbers $(1, 2, 3, 4)$ are given. On each step one chooses 2 neighboring numbers (first and fourth numbers are considered as neighboring) and increases by 1. Is it possible after some steps get numbers $(2015, 2016, 2017, 2016)$?

Problem 2.7. Find the number of acute triangles that has perimeter less than 100 and sides are 3 consecutive positive integers.

Problem 2.8. In the triangle ABC one has $\angle A = 70^\circ$. The point D is chosen on the segment AC such that the bisector AE intersects BD at point H and $AH : HE = 3 : 1$. as well $BH : HD = 5 : 3$. Find $\angle C$.

Solution submission deadline September 7, 2019