Problems Collection (Volume X)

These ten problems come from Chinese National Olympiad in Mathematics - Province Contest.

Problem 1 Polynomial $P(x)=x^5+a_1x^4+a_2x^3+a_3x^2+a_4x+a_5$, and we know when k=1, 2, 3, 4, P(k)=2007*k. Calculate P(10)-P(-5).

Problem 2 The sum of 100 positive integers a_1, a_2, ..., a_{100} is 2007. Calculate the maximum possible value of $\sum_{1\le i<j<k\le 100} a_i a_j a_k$.

Problem 3 Calculate 100101102103104.....498499500 modulo 126.

Problem 4 We define the sum of the first n numbers of geometric progression $\{a_n\}$ S_n. Now we know $S_7=7$, $S_{14}=2014$. Calculate $S_7*(S_{21}-S_{14})$.

Problem 5 Calculate the sum of this kind of positive integers n(n>=4): n satisfies that n! can be written as the product of n-3 consecutive positive integers.

Problem 6 Two vertices of a square are on the line y=2x-17, while the other two are on the parabola $y=x^2$. Calculate the sum of two different possible values of the area of this square.

Problem 7 A, B, C, D are four fixed points in the space and they are not on the same plane. Calculate the number of different parallelepipeds, which satisfies that 4 vertices of the parallelepiped are A, B, C and D.

Problem 8 Polynomial x^2-x-1 exactly divides Polynomial $a_1x^{17}+a_2x^{16}+1$. Calculate a_1*a_2.

Problem 9 Suppose x is an acute angle, calculate the minimum possible value of (*sin* x +*cos* x)/(*sin* x +*tan* x) + (*tan* x +*cot* x)/(*cos* x +*tan* x) + (*sin* x +*cos* x)/(*cos* x +*cot* x) + (*tan* x +*cot* x)/(*sin* x +*cot* x).

Problem 10 Suppose $x^4+y^4+z^4=m/n$, x, y, z are all real numbers, satisfying x*y+y*z+z*x=1 and 5*(x+1/x)=12*(y+1/y)=13*(z+1/z); m, n are positive integers and their greatest common divisor is 1. Calculate m+n.

Input

There is no input.

Output

Ten lines, each contains a single integer denoted the answer to the correspoding problem.

Example

There is no example.