Part I.   **ALGEBRA I**   *Time Limit: 10 minutes*

The word "compute" calls for an exact answer in simplest form.

2 - 1. Compute the number of ordered pairs of positive integers (x, y) that satisfy $y \leq 16 - 4x$.

2 - 2. Compute the whole number N such that $N^6 = 6,321,363,049$.

Part II.   **GEOMETRY**   *Time Limit: 10 minutes*

The word "compute" calls for an exact answer in simplest form.

2 - 3. A square has three vertices at $(7, 1)$, $(3, 4)$, and $(6, 8)$. Compute the coordinates of the fourth vertex.

2 - 4. The square base of a pyramid has perimeter 24 cm. The volume of the pyramid is 60 cubic centimeters. Each of the four isosceles triangular sides of the pyramid has a height of H cm. Compute H.

Part III.   **ALGEBRA II / ADVANCED TOPICS**   *Time Limit: 10 minutes*

The word "compute" calls for an exact answer in simplest form.

2 - 5. On Monday, two students in a class were randomly sent to the board to do a problem. On Tuesday, there were four students absent; again, two students were sent to the board to do a problem. If there were 102 fewer ways to send the students to the board on Tuesday than on Monday, compute the number of students in the class.

2 - 6. Compute the value of $(\sqrt{3} - i)^4 + (\sqrt{3} + i)^4$. *Recall that $i = \sqrt{-1}$.*

Contest #2.   **TEAM ROUND**   Calculators are not permitted on this contest.

T-1. Sammy and Tammy go out for a one-hour jog. Sammy alternates between running for 5 minutes at 6 miles per hour and then walking for 1 minute at 2 miles per hour. Tammy runs at a constant pace of M miles per hour. Sammy and Tammy finish their jog at the same time. Compute M.

T-2. Compute the value of the greatest integer N such that 7^N divides 2015!.

T-3. Let $f(x) = x^3 - 6x^2 + 8x - 5$. If $f(x)$ can also be expressed $f(x) = (x-2)^3 + b(x-2)^2 + c(x-2) + d$, compute the ordered triple (b, c, d).

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