Bergen County Math League

Good Luck to You  **Good Luck to All**

Contest #4 **2021-2022** **12 minutes** **Questions 1 & 2**

4-1. What is the largest possible degree-measure of an angle of a triangle if the degree-measures of all three angles are positive integers?

4-2. For what integer k > 0 can $\left(\sqrt{2}-1\right)^5$ be written as $\sqrt{k+1}-\sqrt{k}$, the difference between the square roots of two consecutive integers?

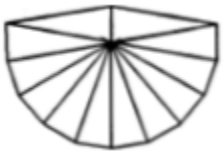
Bergen County Math League

Good Luck to You **Good Luck to All**

Contest #4 **2021-2022** **12 minutes** **Questions 3 & 4**

4-3. In a certain sequence of numbers, each number after the first is the sum of all the preceding numbers. If this sequence's 100^{th} term is 2021, what is its 101st term?

4-4. Twelve congruent isosceles triangles share a common vertex, as shown. If the sum of the measures of all the angles that share the common vertex is 360°, what is the measure of each triangle's smallest angle?



Bergen County Math League

Good Luck to You **Good Luck to All**

Contest #4 **2021-2022** **12 minutes** **Questions 5 & 6**

4-5. A magical hat takes any number fed into it and divides 1492 by that number. If 2022 is fed into the machine and the first output is fed back into the machine, what is the value of the second output?

4-6. There are an infinite number of ordered pairs of positive integers (m, n) such that $m^3 = n^2$ and $m + n$ is a perfect square. One such pair is (m, n) = (9,27). What is the largest value of $m < 1000$ for which such an ordered pair exists?