Bergen County Math League

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

Contest #5 **2021-2022** **12 minutes** **Questions 1 & 2**

5-1. If 23 is written as the sum of the squares of 4 positive integers (not necessarily different), what is the largest square in this sum?

5-2. What is the smallest integer $x > 1$ for which $\sqrt{x\sqrt{x\sqrt{x}}}$ is an integer?

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Contest #5 **2021-2022** **12 minutes** **Questions 3 & 4**

5-3. When ten mathletes huddled together, they spaced themselves equally around a circle. The sum of the numbers on their uniforms was 300. If each number was the average of the two numbers nearest it, what was the largest of the ten numbers on their uniforms?

5-4. All real values of $x \neq 0$ that satisfy $|x|^{x^2-x-2} < 1$ satisfy $p < x < q$. If P is the largest possible value of p and Q is the smallest value of q, what is the ordered pair (P, Q)? (Note: Enter the value of P first, then the value of Q.)

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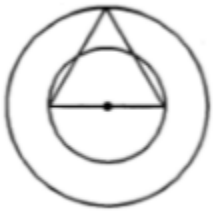
Contest #5 **2021-2022** **12 minutes** **Questions 5 & 6**

5-5. One side of an equilateral triangle is the diameter of a circle, and one vertex of the triangle lies on a larger circle, concentric with the smaller circle, as shown. If the area of the smaller circle is 16π, the area of the larger circle is $k\pi$. What is the value of k?



5-6. The length of each side of a triangle is the reciprocal of a different integer. If one of these integers is 2015, what is the least possible sum of the other two integers?