Bergen County Math League

NO Calculators

Good Luck to You

BCML

Good Luck to All

Contest #6   **2022-2023**   **12 minutes**   Questions 1 & 2

6-1. The length of the chord common to two coplanar intersecting circles is 24, and the lengths of the radii of the two circles are 13 and 15 respectively. Find the two possible distances between the centers of the two circles.

6-2. If x is an acute angle and $\tan^2 x - 4\tan x + 1 = 0$, find the numerical value of $\sin 2x$.

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Contest #6   **2022-2023   12 minutes**   **Questions 3 & 4**

6-3.   A number is one more than its reciprocal. Find the sum of the fourth power of this number and the fourth power of its reciprocal.

6-4.   Randomly select an integer from the set of integers -100 to 100 inclusive. Find the probability that the square of the integer thus selected will have a unit's digit of 1.

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Contest #6

2022-2023   12 minutes

Questions 5 & 6

6-5.   Find all real values of x for which $x^4 - 4x^3 + 5x^2 - 4x + 1 = 0$.

6-6.   On a standard die, the sum of any pair of opposite faces is 7. A $3 \times 3 \times 3$ cube is formed by gluing together 27 standard cubical dice. Find the smallest possible sum of all the numbers showing on the surface of the cube.