**Bergen County Math League**

**NO Calculators Permitted**

**Good Luck to You** 

**Good Luck to All**

**Contest #6** **2025-2026** **12 minutes** **Questions 1 & 2**

6-1. What is the ordered pair of positive integers $(a, b)$, with $a < b$, for which $a^2 + b^2 = 137$ ?

6-2. For all complex numbers $z$ that satisfy $z^2 = i$, what is the largest possible value of $|3 - z|$ ?

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**Contest #6** **2025-2026** **12 minutes** **Questions 3 & 4**

6-3. What are all values of$x$ that satisfy $\log_{10} x = \frac{1}{\log_{10} x}$ ?

6-4. What are all values of $x$ that satisfy $(x^2 + 3x + 1)(x^2 + 3x - 3) \leq -4$ ?

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**Contest #6** **2025-2026** **12 minutes** **Questions 5 & 6**

6-5. What are all values of $x \geq 0$ that satisfy $(x+1)^{\sin x} \geq (x+1)^{x}$ ?

6-6. Let $P(x, y)$ be a point on a unit circle (a circle of radius 1) centered at the origin such that the slope of the line connecting $P$ to the point $(-1,0)$ is rational. If $P$ is ***not*** the point $(-1,0)$, then for how many points $P$ are both $x$ and $y$ irrational?