

CALIFORNIA STATE UNIVERSITY, BAKERSFIELD
Lee Webb Math Field Day 2025
Team Medley, Freshman-Sophomore Level

- Each correct answer is worth ten points. Answers require justification. Partial credit may be given. Unanswered questions are given zero points.
- You have 50 minutes to complete the Exam. When the exam is over, give only one set of answers per team to the proctor. Multiple solutions to the same problem will invalidate each other.
- Elegance of solutions may affect score and may be used to break ties.
- All calculators, cell phones, music players, and other electronic devices should be put away in backpacks, purses, pockets, etc. Leaving early or otherwise disrupting other contestants may be cause for disqualification.

1. Justify that the following method of multiplying two positive numbers a and b works. Given an accurate graph of $y = x^2$, find the points $-a$ and b on the x -axis, and then find the points on the parabola above them. Connect these two points with a line. Where the line intersects the y -axis is the product ab .
2. A standard deck of cards is shuffled and dealt into 4 equal piles. What is the probability there is a king in each pile? You may leave your answer as the product and quotient of integers.
3. Find all positive integer solutions to

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$$

4. What value(s) of x minimize the expression

$$|x - 1| + |x - 2| + |x - 2^2| + |x - 2^3| + |x - 2^4| + \cdots + |x - 2^8|$$