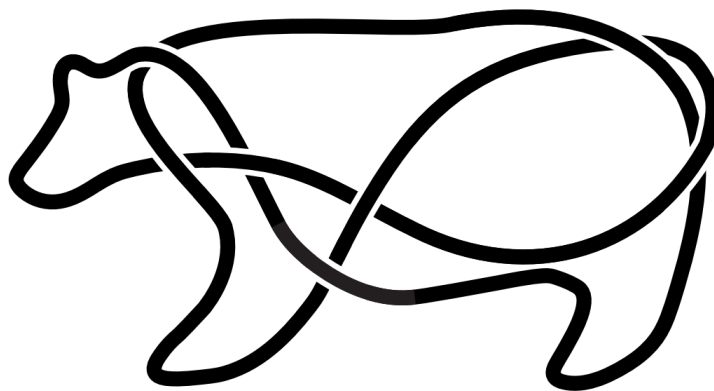# Berkeley Math Tournament 2025

Algebra Tiebreaker

November 8, 2025

Time limit: 15 minutes.

Instructions: This tiebreaker contains 3 short answer questions. All answers must be expressed in simplest form unless specified otherwise. You will submit answers to the problem as you solve them, and may solve problems in any order. You will not be informed whether your answer is correct until the end of the tiebreaker. You may submit multiple times for any of the problems, but **only the last submission for a given problem will be graded**. The participant who correctly answers the most problems wins the tiebreaker, with ties broken by the time of the last correct submission.

No calculators. Protractors, rulers, and compasses are permitted.

- Carry out any reasonable calculations. For instance, you should evaluate $\frac{1}{2} + \frac{1}{3}$, but you do not need to evaluate large powers such as 7^8.

- Write rational numbers in lowest terms. Decimals are also acceptable, provided they are exact. You may use constants such as π in your answers.

- Move all square factors outside radicals. For example, write $3\sqrt{7}$ instead of $\sqrt{63}$.

- Denominators do *not* need to be rationalized. Both $\frac{\sqrt{2}}{2}$ and $\frac{1}{\sqrt{2}}$ are acceptable.

- Do not express an answer using a repeated sum or product.

- For fractions, both improper fractions and mixed numbers are acceptable.

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1. Aditya and Pico live 1000 meters apart, and they start walking toward each other's houses at the same time. Pico walks at a constant speed of 65 meters per minute. Aditya walks at a constant speed of 60 meters per minute. How many minutes after they start walking will they meet? (Do NOT include any units in your answer.)

2. Let a and b be real numbers such that $a + b = 16$ and $a^3 - b^3 = ab^2 - a^2b + 2048$. Compute ab^2.

3. A trading card store only sells small and large packs of cards, which cost \$11 and \$18, respectively. Each small pack has the same number of cards, each large pack has the same number of cards, and a large pack has more cards than a small pack. The greatest number of cards that can be bought with \$38 is 48, and the greatest number of cards that can be bought with \$56 is 75. What is the greatest number of cards that can be bought with \$202? In each scenario, not all the money needs to be spent.