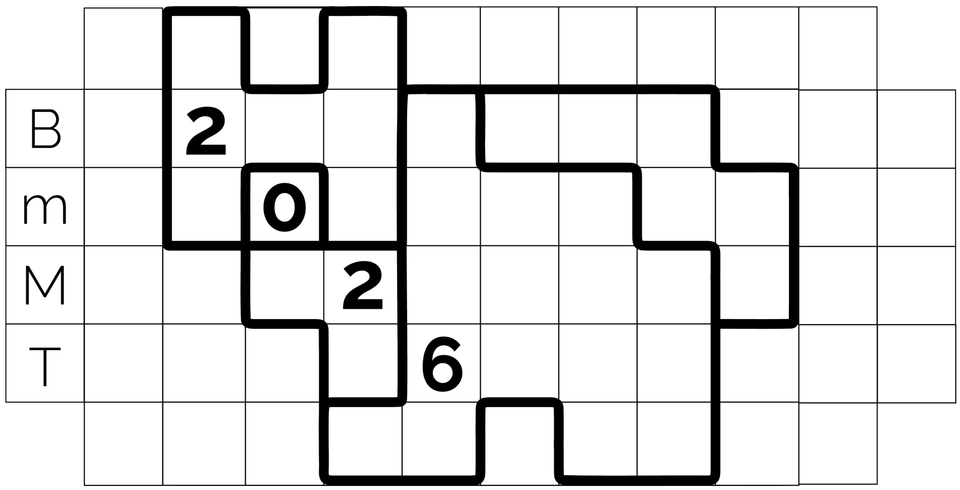
Berkeley mini Math Tournament 2026

Individual Round



April 12, 2026

Time limit: 60 minutes.

Instructions: This test contains 20 short answer questions. All answers must be expressed in simplest form unless specified otherwise. Only answers written inside the boxes on the answer sheet will be considered for grading.

Each correct answer is worth 1 point. Each incorrect or blank answer is worth 0 points.

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

Answer format overview:

- 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.
- Improper fractions and mixed numbers are both acceptable.
- Units are not necessary in any answer. Answers with incorrect units are worth 0 points.

1. Hummus the cat has a black and white striped tail with 5 black segments and 6 white segments. Each black segment has length 1, and each white segment has length 1.5. How long is Hummus's tail?

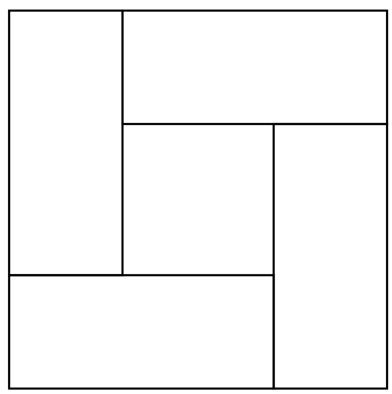
2. Isaac draws a circle with diameter 4. He then draws a new circle whose area is 4 times the area of the original circle. Compute the area of the new circle divided by the circumference of the new circle.

3. For all real numbers a and b, let $a \oslash b = 2a - b$. Compute $(3 \oslash 5) \oslash 7$.

4. Aarush writes the number -1 on a whiteboard. Every minute, he replaces the current number on the whiteboard, n, with $n^2 - n$. What number is written on the board after 2026 minutes?

5. How many ways are there to order the letters in "$BMMT$" such that the two M's are next to each other? For example, two such orderings are "$BMMT$" and "$TMMB$."

6. Four congruent rectangles are arranged as shown below to form a large outer square with a small square hole in the center. The side length of the large outer square is 14, and the side length of the small square hole is 2. What is the length of the diagonal of one of the four rectangles?



7. Jonathan and Mary go out to eat. Jonathan always tips 15% of his bill, and Mary always tips 25% of hers. If Jonathan orders spaghetti and Mary orders risotto, they pay exactly \$55.50 (including tips) in total. If instead Jonathan orders risotto and Mary orders spaghetti, they pay exactly \$54.90 (including tips) in total. What is the sum of the costs of spaghetti and risotto without tipping?

8. Compute the sum of all real numbers x satisfying $4(x + 11)^2 = 9(x + 1)^2$.

9. Compute the smallest positive whole number with the property that the product of its digits is 120.

10. Kaity is moving several boxes from her van to the classroom. She picks up either one or two boxes at the van, carries them to the classroom, drops off the boxes, and then walks back to the van, repeating the process until all the boxes are in the classroom and she is back at the van.

    Her walking speed when carrying no boxes is 2.8 miles per hour, and her walking speed when carrying one box is 2.4 miles per hour. She finds that it doesn't matter whether she carries one box or two boxes at a time: either way, it will take the same amount of time to move all of the boxes. What is Kaity's walking speed in miles per hour while carrying two boxes? Assume that Kaity picks up and drops off the boxes immediately.

11. Define the *drift* of a point (x, y) in the coordinate plane as $x + y$. Three corners of a square in the coordinate plane have drifts of 8, 11, and 25, in some order. What is the maximum possible drift of the fourth corner of the square?

12. Ben and Theo enter a classroom with the number 0 written on the blackboard. Ben and Theo repeatedly take turns replacing the number on the blackboard, with Ben going first. Ben writes the smallest multiple of 3 greater than the current number and Theo writes the smallest multiple of 4 greater than the current number. The first few numbers that appear on the blackboard are

$$0, 3, 4, 6, 8, \ldots.$$

What is the 100th number that appears on the blackboard, including the initial 0?

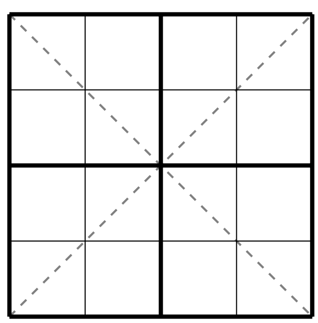
13. For each positive whole number n, let $T(n) = 1 + 2 + 3 + \cdots + n$ be the nth triangular number. It is known that $T(n) = n(n+1)/2$. What is the sum of all positive whole numbers m for which

$$\frac{T(m+2) + T(m+4)}{T(m)}$$

is a whole number?

14. Jessica has a 2×3 grid of square cells. In how many ways can she color two cells red and the remaining four cells blue if colorings that differ by a rotation are considered the same, but colorings that differ by a reflection are considered different?

15. In a 4×4 Sudoku solution, each column, row, and bolded 2×2 region contains exactly one of each digit from 1 to 4, and each cell contains exactly one digit. A Sudoku solution is *super* if each of the two main diagonals also contains exactly one of each digit from 1 to 4. How many distinct 4×4 super Sudoku solutions exist if rotations and reflections are considered distinct?



16. An ordered triple of numbers (a, b, c) is *stable* if it is equal to a permutation of $(|a-b|, |b-c|, |c-a|)$ and $a + b + c \leq 2026$. For example, $(0, 0, 0)$ and $(1, 1, 0)$ are stable. Compute the number of stable ordered triples of nonnegative integers.

17. Triangle $\triangle ABC$ has $AB = BC$ and is inscribed in circle O. Circle P passes through A and B and intersects line segment $\overline{AC}$ at $D \neq A$. Line ℓ_1 passes through D and is parallel to $\overline{AB}$. Line ℓ_2 is tangent to circle O at C and is perpendicular to ℓ_1, intersecting it at E. Given that $EC = \frac{16}{3}$ and that the longest side length of $\triangle ABC$ is 16, compute the radius of P divided by the radius of O.

18. A permutation of the set $\{1, 2, \ldots, 10\}$ is called *mountainous* if the elements increase to a peak and then decrease. The peak cannot be the first or the last element. What fraction of mountainous permutations have the property that the sum of the first element and the last element is odd?

19. Let c and d be distinct real numbers. The parabolas $y = x^2 + cx + d$ and $y = -x^2 + dx + c$ are graphed in the coordinate plane. There are two lines that are tangent to both parabolas, and their slopes are c and d. Compute $c - d$.

20. Points A, B, C, D, and E lie on a circle in that order such that $\angle ABD = 90^\circ$ and $\angle ADC = \angle CBE = 60^\circ$. Segments $\overline{BD}$ and $\overline{CE}$ intersect at point F. The circle passing through points A, B, and F intersects $\overline{AE}$ at $G \neq A$. Given $BF = 10$ and $DF = 8$, compute AG.