Accuracy Round

LMT Spring 2026

May 9, 2026

1. **[7]** Square $ABCD$ has side length 8. Sides $\overline{AB}, \overline{BC}$, and $\overline{CD}$ have midpoints P, Q, and R respectively. Segments $\overline{BD}$ and $\overline{QD}$ intersect segment $\overline{PR}$ at points X and Y respectively. Find the area of quadrilateral $BQYX$.

2. **[7]** Jerry has five distinct positive integers. Their mean is 10, their median is 11, and the largest number is 5 more than the second largest number. Find the largest possible value of Jerry's smallest number.

3. **[8]** Peter and Larry both pick a positive integer from 1 to 6, inclusive, and secretly tell their friend Tnag their respective numbers. Then, the following four true statements are made:

   - Tnag announces that "Peter's number is at least 3 times as large as Larry's number".
   - Larry responds, "I still don't know Peter's number".
   - Peter says, "And I don't know Larry's".
   - Finally, Larry states, "Oh, now I know Peter's number".

   Find the ordered pair (Larry's number, Peter's number).

4. **[8]** Find the number of real numbers x that satisfy the equation

$$\lceil x \rceil + \lfloor x \rfloor = \frac{4049}{2026} x.$$

5. **[11]** Let $N = 76393728$ be an 8-digit number that is divisible by 128. Find the number of 8-digit multiples of 128 M such that M and N differ by one digit. *For example,* 76793728 *is a valid M since only one of its digits differ from N's digits and it is divisible by 128 .*

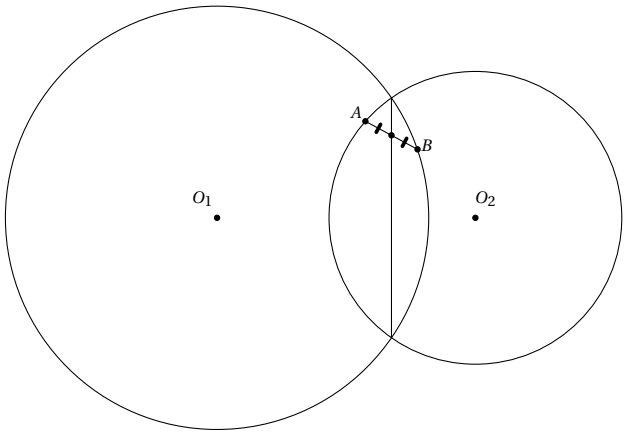
6. **[12]** A bag starts with 2 red balls and 1 green ball. At each step, two balls are drawn uniformly at random without replacement from the bag, then returned to the bag, and 1 green ball is added. The process ends when both drawn balls are red. Find the probability that the process never ends.

7. **[12]** Find the unique 4-digit positive integer $\underline{abcd}$ such that $a \neq 0$, $c \neq 0$, and

$$\underline{abcd} = 2\left(\underline{cdab}\right) + 2.$$

   Note: $\underline{abcd}$ refers to the 4-digit number formed by writing out the digits a, b, c, and d in that order.

8. **[15]** In the diagram below, the two marked segments have the same length. Furthermore, the distance from O_1 and O_2 to line AB are 6 and 5, respectively, and the radius of the circle centered at O_1 is 12. Find the radius of the circle centered at O_2. *Note: Diagram is not necessarily drawn to scale.*



9. **[16]** A 2026×2026 grid is filled with integers from 0 to 2026, inclusive, such that the same number does not appear twice in any row or column. Call a cell of a grid *complete* if every integer from 0 to 2026 either appears in its row or in its column. Find the largest possible fraction of cells that are *complete*.

10. **[17]** Define S_n as the set $\left\{\left\lfloor \frac{n}{1} \right\rfloor, \left\lfloor \frac{n}{2} \right\rfloor, \cdots, \left\lfloor \frac{n}{n} \right\rfloor\right\}$. For example, $S_{15} = \{1,2,3,5,7,15\}$. Call a positive integer n *golden* if $9 \in S_{n-1}$ but $9 \notin S_n$. Find the sum of all n that are *golden*.

11. **[18]** From 2026 equally spaced points on the circumference of a circle, four points are chosen uniformly at random and labeled A, B, C, and D, in clockwise order. Find the probability that the shorter arc between A and C has the same length as the shorter arc between B and D.

12. **[19]** Let $ABCD$ be a convex quadrilateral inscribed in a circle. Points X and Y are the feet from A and D to line BC. Suppose that the midpoint of BC is also the midpoint of XY, $AB = 25$, $CD = 39$, and $AD = 65$. Find BC.

13. **[TIEBREAKER]** Eddie picks a point P uniformly at random from the interior of a square S with side length 2, and draws a unit circle Γ centered at P. Estimate the expected value of the area of the region(s) consisting of points inside of S but outside of Γ. Express your answer in the form $a.bcdef$.