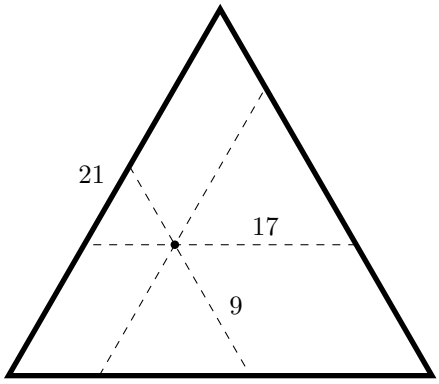
Geometry Round

May 17, 2026

LAMT 2026

1. Let $LAMT$ be a square with center O and side length 12. Points U and C lie inside $LAMT$ so that $UCLA$ is a quadrilateral, $\angle UOC = 90°$, and $OU = OC = 4$. Find the minimum possible area of $UCLA$.

2. Aedan has a cookie shaped like an equilateral triangle with side length 21. Aedan makes three cuts through the cookie, each parallel to a different side of the cookie and all three of them passing through a single point. If two of these cuts have lengths 9 and 17, find the length of the third cut.

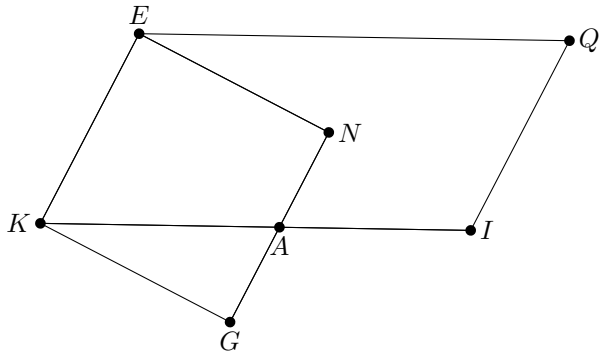


3. Let regular pentagon $ABCDE$ have side length 5. The circle with diameter AC intersects the circle with diameter AE at $P \neq A$. Find $PB^2 + PE^2$.

4. Circles ω_1, centered at O_1, and ω_2, centered at O_2, are externally tangent at point B. Line segment $\overline{AC}$ passes through B, with $A \neq B$ on ω_1 and $C \neq B$ on ω_2. Given that the area of quadrilateral O_1CO_2A is 128 and $AC = 32$, find the length of O_1O_2.

5. Let $A_1A_2A_3A_4A_5A_6$ be a regular hexagon, and let $A_7 = A_1$. For $1 \leq i \leq 6$, point B_i lies on segment $\overline{A_iA_{i+1}}$ such that $A_iB_i = 2$ and $B_iA_{i+1} = 5$. For $1 \leq i \leq 6$ the circumcenter of $B_iA_{i+1}B_{i+1}$ is O_i (where we let $B_7 = B_1$). Find the area of $O_1O_2O_3O_4O_5O_6$.

6. Parallelogram $KEQI$ satisfies $\frac{KE}{EQ} = \frac{1}{2}$. Square $KENG$ has segment $\overline{NG}$ intersect segment $\overline{KI}$ at point A. Given that the ratio of the area of ANI to the area of ENA is $3 : 5$ and $EA = 5$, find the area of $KEQI$.



7. Let $ABCD$ be a convex quadrilateral with $\angle A = \angle D = 90°$ and $CD < AB = 31$. A circle intersects the midpoint of BC and is tangent to AD. In addition, segments $\overline{AB}$, $\overline{BC}$, and $\overline{CD}$ each intersect the circle at 2 points, forming three chords of length 10. Find the area of $ABCD$.

8. Convex pentagon $ABCDE$ has $\angle A = \angle B = \angle C = 90°$. Let M be the midpoint of ED. Suppose $AE = 10$, $ED = 14$, and $BM = 23$. Find the minimum possible length of CD.

9. Let $\mathcal{P}_1$ and $\mathcal{P}_2$ be two parabolas with focus $(6, 8)$ and directrices equal to the x-axis and the y-axis, respectively. The common external tangent of the two parabolas and the line connecting their two points of intersection meet at point X. Find the coordinates of X.

10. Triangle ABC has $AB = 6$, $AC = 8$, and the angle bisector of $\angle BAC$ meets $\overline{BC}$ at D. Circles ω and Ω are drawn such that ω passes through B, and Ω passes through C, and they are both tangent to AD at D. Let ω meet AB at F, and Ω meet AC at E. Segment $\overline{EF}$ passes through point $H \neq F$ on ω and point $G \neq E$ on Ω. Given $FH + GE = HG$, find the length of BC.

11. **[TIEBREAKER]** Let O be the origin, and $\mathcal{C}$ be a unit cube centered at O. A point P is selected uniformly at random from the surface of a unit sphere centered at O. The plane passing through O which is perpendicular to OP intersects $\mathcal{C}$ at a polygon $\mathcal{Q}$. Estimate the expected value of the length of the longest side of $\mathcal{Q}$.

    Express your answer as a number in base 10 (submissions not in this form will not be accepted). Ties will be broken based on distance to the correct answer.