

**#1 Geometry – Hustle**  
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What is the surface area of a sphere inscribed in a cube that has side length 5?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#1 Geometry – Hustle**  
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What is the surface area of a sphere inscribed in a cube that has side length 5?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#1 Geometry – Hustle**  
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What is the surface area of a sphere inscribed in a cube that has side length 5?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#1 Geometry – Hustle**  
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What is the surface area of a sphere inscribed in a cube that has side length 5?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#2 Geometry – Hustle**

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What is the sum of the volumes of the cones created by rotating a triangle with side lengths 5, 12, and 13  $360^\circ$  about the two shorter sides?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#2 Geometry – Hustle**

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---

What is the sum of the volumes of the cones created by rotating a triangle with side lengths 5, 12, and 13  $360^\circ$  about the two shorter sides?

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Round 1 2 3 4 5

**#2 Geometry – Hustle**

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Round 1 2 3 4 5

**#2 Geometry – Hustle**

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Round 1 2 3 4 5

### #3 Geometry – Hustle

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An isosceles triangle has perimeter 32 and two of its side lengths are  $3x$  and  $x^2 - 6$ . The sum of all possible values of  $x$  can be expressed as  $a + \sqrt{b}$  where  $a$  and  $b$  are positive integers. Find  $a + b$ .

Answer : \_\_\_\_\_

Round 1 2 3 4 5

### #3 Geometry – Hustle

#### MA $\text{\textcircled{C}}$ National Convention 2024

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### #3 Geometry – Hustle

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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#4 Geometry – Hustle**

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A regular hexagon is inscribed in a circle, which is inscribed in a regular hexagon. What is the ratio (as a fraction) of the area of the smaller hexagon to the area of the larger hexagon?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#4 Geometry – Hustle**

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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#5 Geometry – Hustle**

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The centers of two circles with radii 8 and 7 are 21 apart. What is the product of the length of the two internal tangents of these circles?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#5 Geometry – Hustle**

**MA $\odot$  National Convention 2024**

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**#5 Geometry – Hustle**

**MA $\odot$  National Convention 2024**

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Round 1 2 3 4 5

**#6 Geometry – Hustle**

**MA $\text{\textcircled{C}}$  National Convention 2024**

---

A point in an equilateral triangle with area  $16\sqrt{3}$  is 2, 4, and  $x$  units from each side. What is  $x$ ?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#6 Geometry – Hustle**

**MA $\text{\textcircled{C}}$  National Convention 2024**

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Round 1 2 3 4 5

**#7 Geometry – Hustle**

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Regular octagon *TROPICAL* has perimeter 80.

What is the area of *RPCL*?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#7 Geometry – Hustle**

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**#7 Geometry – Hustle**

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**#7 Geometry – Hustle**

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Round 1 2 3 4 5

**#8 Geometry – Hustle**

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---

A regular heptagon has a side length of 4. What is the radius of a circle whose circumference is equal to the perimeter of this heptagon?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#8 Geometry – Hustle**

**MA $\odot$  National Convention 2024**

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Round 1 2 3 4 5



**#9 Geometry – Hustle**

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What is the positive difference between the number of diagonals and the sum of the interior angles (in degrees) of a convex nonagon?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#9 Geometry – Hustle**

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Round 1 2 3 4 5

**#10 Geometry – Hustle**  
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A four-leaf clover is formed by four congruent circles which are arranged so that they share one point common to all four circles and their centers form the vertices of a square. The diameter of each circle is 8. What is the area of this four-leaf clover?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#10 Geometry – Hustle**  
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Round 1 2 3 4 5

**#11 Geometry – Hustle**  
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---

The ratio of the surface areas of two similar icosahedrons is 3 to 5. If the volume of the larger one is 100, what is the volume of the smaller one?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#11 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#12 Geometry – Hustle**  
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Ben the goat walks directly north from a river that runs east to west. He walks for 4 hours at a rate of 4 miles per hour to a carrot farm, where he eats lunch. Then, he walks back to the river for water at a rate of 5 miles per hour. After he drinks, he continues at 5 miles per hour until he gets to the barn. The barn is 36 miles east and 32 miles north of his starting point at the river. What is the minimum amount of time in hours that he spends walking?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#12 Geometry – Hustle**  
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Round 1 2 3 4 5

**#13 Geometry – Hustle**  
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Isosceles trapezoid  $SAND$  has area 40, and  $SA$  and  $ND$  are parallel with  $SA = 8$  and  $ND = 12$ . If the intersection of the diagonals of this trapezoid is  $Y$ , what is the area of triangle  $SDY$ ?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#13 Geometry – Hustle**  
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Round 1 2 3 4 5

**#13 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#14 Geometry – Hustle**  
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Circles  $O$  and  $S$  intersect at points  $X$  and  $Y$ . The radius of circle  $O$  is 5, the radius of circle  $S$  is 7, and  $OS$  is 8. Find the length of  $XY$ .

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#14 Geometry – Hustle**  
**MA $\odot$  National Convention 2024**

---

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Round 1 2 3 4 5

**#14 Geometry – Hustle**  
**MA $\odot$  National Convention 2024**

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Round 1 2 3 4 5

**#14 Geometry – Hustle**  
**MA $\odot$  National Convention 2024**

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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#15 Geometry – Hustle**  
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Square *FISH* has area 36. Equilateral triangle *SHY* is drawn in the same plane as the square with *Y* being inside square *FISH*. What is  $FY^2$ ?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#15 Geometry – Hustle**  
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Square *FISH* has area 36. Equilateral triangle *SHY* is drawn in the same plane as the square with *Y* being inside square *FISH*. What is  $FY^2$ ?

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Round 1 2 3 4 5

**#15 Geometry – Hustle**  
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**#15 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#16 Geometry - Hustle**

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What is the area of the convex polygon with vertices  $(2,6)$ ,  $(6,2)$ ,  $(5,-4)$ ,  $(-3,-3)$ , and  $(-2,3)$ ?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#16 Geometry - Hustle**

**MA $\odot$  National Convention 2024**

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What is the area of the convex polygon with vertices  $(2,6)$ ,  $(6,2)$ ,  $(5,-4)$ ,  $(-3,-3)$ , and  $(-2,3)$ ?

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Answer : \_\_\_\_\_

Round 1 2 3 4 5



**#17 Geometry – Hustle**  
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Richard has a pet iguana. He ties it on a 3-foot leash to one vertex of a regular hexagonal fence with a perimeter of 12 feet. What is the area the iguana can roam if it is unable to enter the area enclosed by the fence?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#17 Geometry – Hustle**  
**MA<sup>©</sup> National Convention 2024**

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Round 1 2 3 4 5

**#18 Geometry – Hustle**  
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Triangle  $GAR$  has a median from  $A$  that meets  $GR$  at  $X$ . Given  $AX = 20$ ,  $AR = 30$  and  $m\angle XAR = 60^\circ$ . What is the length of  $GR$ ?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#18 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#19 Geometry – Hustle**  
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---

A dartboard is formed by four concentric circles with radii 1, 2, 3, and 4. The center circle holds 20 points, and the rings hold 15, 10, and 5 points going from the innermost to the outermost. What is the expected score of one random dart throw, assuming that the dartboard is hit?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#19 Geometry – Hustle**  
**MA<sup>©</sup> National Convention 2024**

---

A dartboard is formed by four concentric circles with radii 1, 2, 3, and 4. The center circle holds 20 points, and the rings hold 15, 10, and 5 points going from the innermost to the outermost. What is the expected score of one random dart throw, assuming that the dartboard is hit?

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**#19 Geometry – Hustle**  
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**#19 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#20 Geometry – Hustle**

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---

Trapezoid *PALM* has right angles at *A* and *L* and  $PA = 2$ ,  $AL = 4$ , and  $LM = 4$ . Point *Y* is the midpoint of *PM*. What is the area of *PALY*?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#20 Geometry – Hustle**

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---

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Round 1 2 3 4 5

**#20 Geometry – Hustle**

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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#20 Geometry – Hustle**

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Trapezoid *PALM* has right angles at *A* and *L* and  $PA = 2$ ,  $AL = 4$ , and  $LM = 4$ . Point *Y* is the midpoint of *PM*. What is the area of *PALY*?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#21 Geometry – Hustle**  
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A frustum is cut out of a right pyramid with a square base. If the top base has a perimeter 12 and the bottom base has a perimeter 40 and the height of the frustum is 14, what is the volume of the frustum?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#21 Geometry – Hustle**  
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A frustum is cut out of a right pyramid with a square base. If the top base has a perimeter 12 and the bottom base has a perimeter 40 and the height of the frustum is 14, what is the volume of the frustum?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#21 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#21 Geometry – Hustle**  
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A frustum is cut out of a right pyramid with a square base. If the top base has a perimeter 12 and the bottom base has a perimeter 40 and the height of the frustum is 14, what is the volume of the frustum?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#22 Geometry - Hustle**  
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Triangle  $COD$  has side lengths  $CO = 29$ ,  $OD = 20$ , and  $CD = 17$ . The line through the incenter of triangle  $COD$  parallel to  $OD$  intersects  $CO$  at  $X$  and  $CD$  at  $Y$ . What is the perimeter of triangle  $CXY$ ?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#22 Geometry - Hustle**  
**MA<sup>©</sup> National Convention 2024**

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Round 1 2 3 4 5

**#22 Geometry - Hustle**  
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Round 1 2 3 4 5

**#22 Geometry - Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#23 Geometry – Hustle**  
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A kite with area 168 has one diagonal which is divided by the other diagonal into segments of length 5 and 9. What is the perimeter of the quadrilateral whose four vertices are the midpoints of the kite's sides?

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#23 Geometry – Hustle**  
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---

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Answer : \_\_\_\_\_

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**#23 Geometry – Hustle**  
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Round 1 2 3 4 5

**#23 Geometry – Hustle**  
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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#24 Geometry - Hustle**  
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Find the area of a triangle with side lengths 10, 17, and 21.

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#24 Geometry - Hustle**  
**MA<sup>©</sup> National Convention 2024**

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Find the area of a triangle with side lengths 10, 17, and 21.

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#24 Geometry - Hustle**  
**MA<sup>©</sup> National Convention 2024**

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Find the area of a triangle with side lengths 10, 17, and 21.

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#24 Geometry - Hustle**  
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Find the area of a triangle with side lengths 10, 17, and 21.

Answer : \_\_\_\_\_

Round 1 2 3 4 5



**#25 Geometry - Hustle****MA@ National Convention 2024**

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In the Cartesian plane, point  $A$  lies on the graph of  $(x - 3)^2 + (y + 2)^2 = 16$ . Point  $B$  lies on the graph of  $(x + 9)^2 + (y + 8)^2 = 45$ . Find the maximum possible distance between  $A$  and  $B$ .

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#25 Geometry - Hustle****MA@ National Convention 2024**

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In the Cartesian plane, point  $A$  lies on the graph of  $(x - 3)^2 + (y + 2)^2 = 16$ . Point  $B$  lies on the graph of  $(x + 9)^2 + (y + 8)^2 = 45$ . Find the maximum possible distance between  $A$  and  $B$ .

Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#25 Geometry - Hustle****MA@ National Convention 2024**

---

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Answer : \_\_\_\_\_

Round 1 2 3 4 5

**#25 Geometry - Hustle****MA@ National Convention 2024**

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Answer : \_\_\_\_\_

Round 1 2 3 4 5