

1

A.P. Leto Comprehensive High School 2-2-91
Geometry Team Round Question 1

A = The measure of an interior angle in a regular pentagon in degrees.

B = The measure of an exterior angle of a regular dodecagon in degrees.

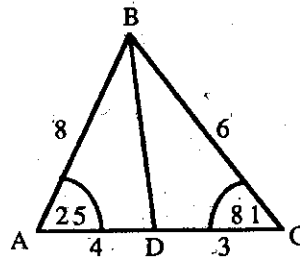
C = The number of diagonals of a nonagon.

Find $A + B - 2C$.

2

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Geometry Team Round Question 2

Given the figure as marked, find $m\angle ADB$.



3

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Geometry Team Round Question 3

Find the difference in the area of a circumscribed circle and an inscribed circle of a 3-4-5 triangle.

4

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Geometry Team Round Question 4

A = The sides of a regular pentagon are extended to form a five pointed star. What is the measure of the angle in degrees at each of the five points?

B = The sum of the measures of the five angles at the points of this star.

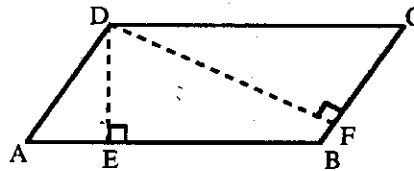
Find $\sqrt{B - A}$.

5

Two different sized vertical poles are driven into level ground. Two laser beams from the top of each pole to the ground-level base of the other pole cross at a point 24 meters above the ground. If the top of the shorter pole is 40 meters above the ground, find the height of the taller pole.

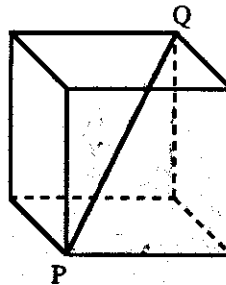
6

Given parallelogram ABCD with $AB = 8$, $BC = 6$, $DE = 4$. Find DF.



7

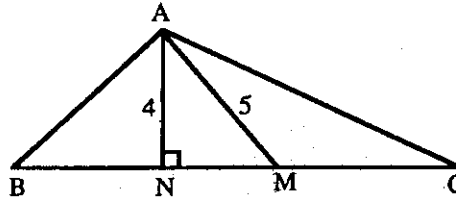
In the adjoining figure, \overline{PQ} is a diagonal of the cube. If \overline{PQ} has length A , find the surface area of the cube in terms of A .



8

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 Geometry Team Round Question 8

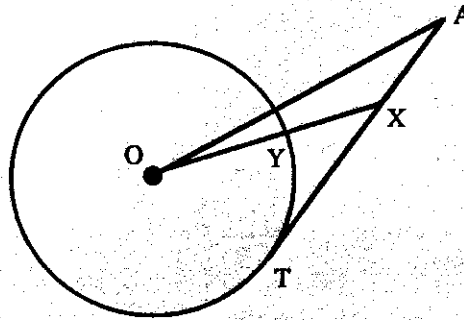
The altitude and median from vertex A of triangle ABC are 4 and 5 units long respectively. The angle determined by \overline{AB} and the median is bisected by the altitude. Find AC.



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 Geometry Team Round Question 9

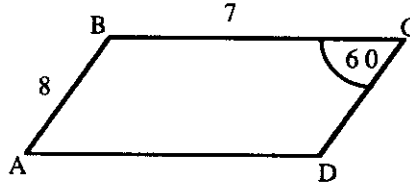
Circle O has a radius of 3, and point A, coplanar with the circle, is 5 units from the center O. One tangent from A to the circle intersects the circle at T. If X is a point on \overline{AT} such that \overline{XO} intersects the circle at a point Y with $XA = XY$, find XA.

9



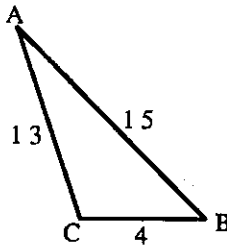
10

In parallelogram $ABCD$, \overline{AC} and \overline{BD} are diagonals. If $BC = 7$ and $AB = 8$ and $m\angle C = 60^\circ$, find the value of $AC^2 - BD^2$.



The lengths of the sides of a triangle are 4, 13, and 15. Find the sine of the angle opposite the side whose length is 13.

11



Two non-intersecting circles O and Q have radii of 9 and 16 respectively. A third circle, P , is tangent to circle O and circle Q and also to one of their common external tangents. If the centers of all three circles are collinear, find x , the radius of circle P .

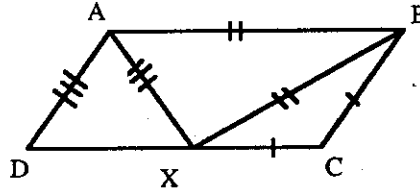
12

A ladder 25 feet long is leaning against a wall 15 feet from the base of the wall. How much nearer to the wall must the base of the ladder be pushed to make the top 4 ft higher on the wall?

13

14

Point X is on side \overline{CD} of parallelogram ABCD. $\angle ADC < 90^\circ$ and $XC = CB$, $XB = BA$, $XA = AD$. Find $m\angle ADX$.



15

Given Quadrilateral ABCD inscribed in circle O of radius 10. $\widehat{AD} = 90^\circ$; $OF = 2\sqrt{7}$; $OG = 7\sqrt{2}$; $OH = 5\sqrt{2}$. Find the area of the shaded region.

