Lengths and Angles

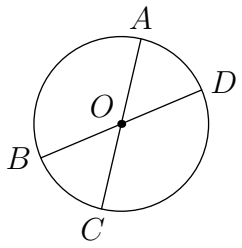
Hope Chinese School Fall Week 3

September 2, 2017

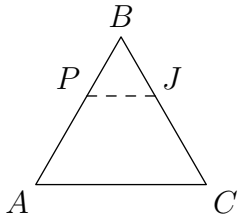
Problems

$\star$ means difficult

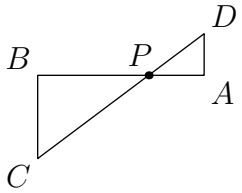
1. In the circle with center O and diameters AC and BD, the angle AOD measures 54 degrees. What is the measure, in degrees, of angle AOB?



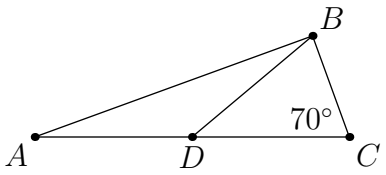
2. An equilateral triangle PBJ that measures 2 inches on each side is cut from a larger equilateral triangle ABC that measures 5 inches on each side. What is the perimeter of triangle $PJCA$?



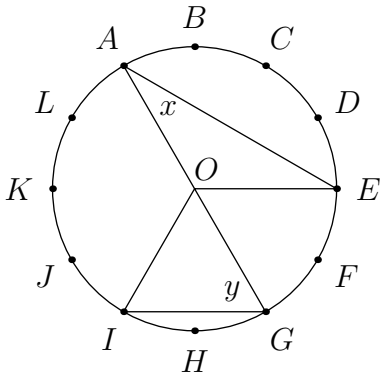
3. In the figure shown, $AD = 4$, $BC = 8$, and $CD = 20$. Also, $\overline{AD} \perp \overline{AB}$ and $\overline{BC} \perp \overline{AB}$. What is the length of $\overline{AP}$?



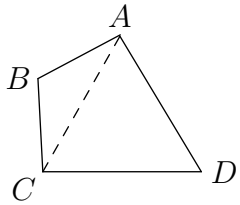
4. In $\triangle ABC$, D is a point on side $\overline{AC}$ such that $BD = DC$ and $\angle BCD$ measures $70°$. What is the degree measure of $\angle ADB$?



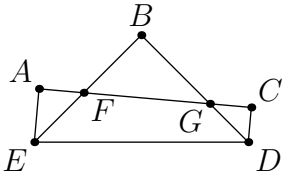
5. The circumference of the circle with center O is divided into 12 equal arcs, marked the letters A through L as seen below. What is the number of degrees in the sum of the angles x and y?



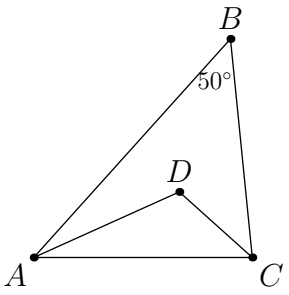
6. In quadrilateral $ABCD$, sides $\overline{AB}$ and $\overline{BC}$ both have length 10, sides $\overline{CD}$ and $\overline{DA}$ both have length 17, and the measure of angle ADC is $60°$. What is the length of diagonal $\overline{AC}$?



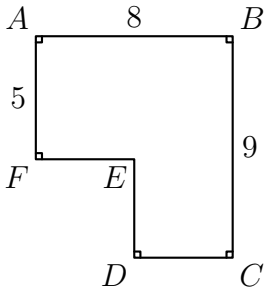
7. In the figure, $\angle A$, $\angle B$, and $\angle C$ are right angles. If $\angle AEB = 40°$ and $\angle BED = \angle BDE$, then find $\angle CDE$.



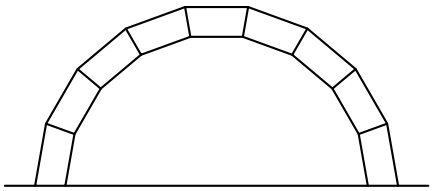
8. The measure of angle ABC is $50°$, $\overline{AD}$ bisects angle BAC, and $\overline{DC}$ bisects angle BCA. What is the measure of angle ADC?



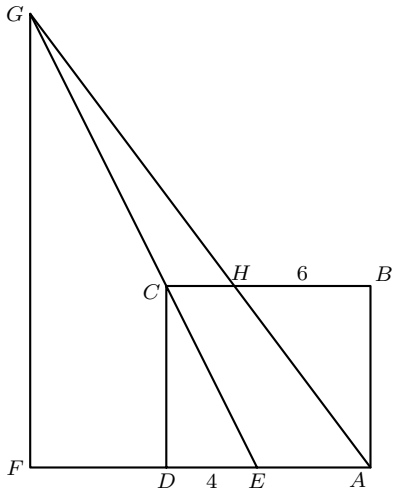
9. The area of polygon $ABCDEF$ is 52 with $AB = 8$, $BC = 9$ and $FA = 5$. What is $DE + EF$?



10. ⋆ The keystone arch is an ancient architectural feature. It is composed of congruent isosceles trapezoids fitted together along the non-parallel sides, as shown. The bottom sides of the two end trapezoids are horizontal. In an arch made with 9 trapezoids, let x be the angle measure in degrees of the larger interior angle of the trapezoid. What is x?



11. ⋆ In rectangle $ABCD$, we have $AB = 8$, $BC = 9$, H is on $\overline{BC}$ with $BH = 6$, E is on $\overline{AD}$ with $DE = 4$, line EC intersects line AH at G, and F is on line AD with $\overline{GF} \perp \overline{AF}$. Find the length GF.


G
H
6
B
C
F
D
4
E
A