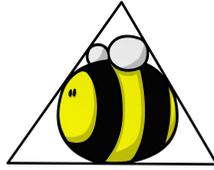
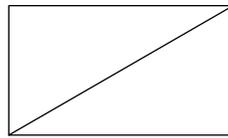


2017 Geometry Bee Preliminary Round

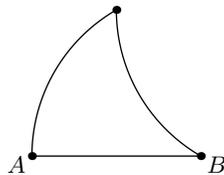


April 24th, 2017 - April 30th, 2017

1. The Democratic Republic of Aprilia has a very simple flag: a rectangle, 6 feet wide and 4 feet long, with a diagonal drawn through it as shown below. The part above the diagonal is red and the part below is blue. How many square feet of cloth are red?



2. A triangle has angles k , $k + 1$, and $2k + 2$ degrees. Find k .
3. Find the area of the triangle that has vertices at points $(0, 5)$, $(0, 8)$, and $(6, 0)$.
4. Steve lives in the Country of Interesting Turkeys, where they use a different unit of length, the ham. Coincidentally, Steve is exactly one ham tall. A giant rectangular cake is 2 hams wide, 3 hams long, and 5 hams tall. Given that this cake has volume 240 cubic feet, how tall is Steve in feet?
5. In $\triangle ABC$, $\angle A = 90^\circ$, $AB = 5$ and $AC = 12$. Let M be the midpoint of BC . Find the perimeter of $\triangle ABM$.
6. Point P is chosen inside of triangle $\triangle ABC$, where $AB = 3$, $BC = 4$, $CA = 5$. If the distance from P to AB and BC are 1 and $\frac{1}{2}$ respectively, find the distance from P to CA .
7. Let $\triangle ABC$ be inscribed in a circle ω . Let the angle bisectors of $\angle A$, $\angle B$, and $\angle C$ meet ω at M , N , and P . If $\angle PMN = 70^\circ$, find $\angle A$ in degrees.
8. Steve the Shark draws a self-portrait of his fin as shown below by drawing two 90° arcs each with length π and a base AB with length 2. Find the area of the shark fin.



9. Let isosceles triangle $\triangle ABC$ be inscribed in circle ω with center O such that $AB = AC$. Let U be the intersection of the angle bisector of $\angle ABC$ with ω and V by the intersection of BU and the angle bisector of $\angle BAC$. Given that $\angle BAC = 40^\circ$, find $\angle OUV$ in degrees.
10. Let $\triangle ABC$ have side lengths $BC = 3$, $CA = 5$, and $AB = 4$. Choose point P on side AB such that $AP = 1$. Let the circle with diameter AP intersect the circumcircle of $\triangle ABC$ at two points A and K . Find the length of KP .