

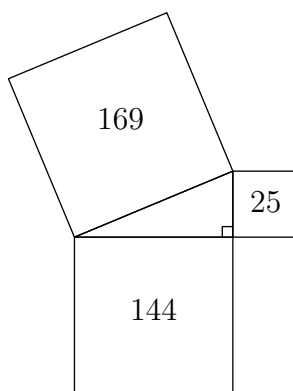
Triangles and Circles

Hope Chinese School Fall Week 6

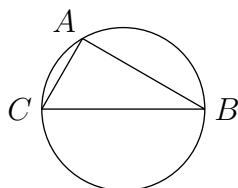
September 23, 2017

Problems

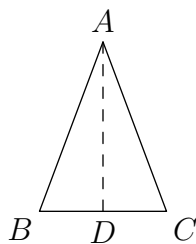
1. The sides of a triangle are 6, 8, 10. Find the length of the altitude to the side of length 10.
2. Given the areas of the three squares in the figure, what is the area of the interior triangle?



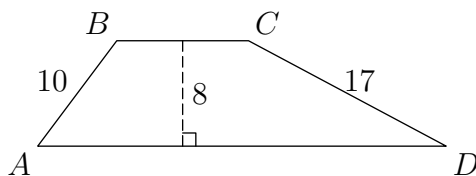
3. The diagram shows a triangle inscribed in a circle of radius 4. Given that $BA \perp AC$ and $\angle ABC = 30^\circ$, find the area of ABC .



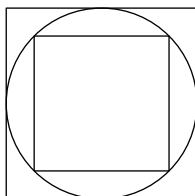
4. In triangle ABC , point D is on segment BC , the measure of angle BAC is 40 degrees, and triangle ABD is a reflection of triangle ACD over segment AD . What is the measure of angle B ?



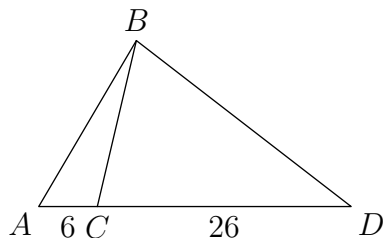
5. Triangle ABD is right-angled at B . On AD there is a point C for which $AC = CD$ and $AB = BC$. Find $\angle DAB$.
6. A triangle has a side of length 6, another side of length 8, and a right angle. What is the shortest possible length of the third side?
7. The area of trapezoid $ABCD$ is 164 cm^2 . The altitude is 8 cm, AB is 10 cm, and CD is 17 cm. What is BC , in centimeters?



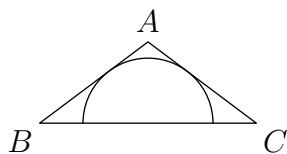
8. A circle is inscribed in a square of length 2, and another square is inscribed in that circle, shown below. What is the area of the smaller square?



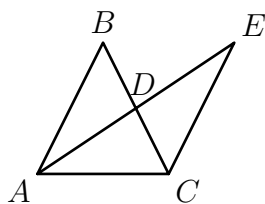
9. In the diagram, the area of triangle ABC is 27 square units. What is the area of triangle BCD ?



10. Find the area of the semicircle inscribed in the triangle, where $AB = AC = 25$ and $BC = 40$.



11. Triangle ABC is an isosceles triangle with $\overline{AB} = \overline{BC}$. Point D is the midpoint of both \overline{BC} and \overline{AE} , and \overline{CE} is 11 units long. Triangle ABD is congruent to triangle ECD . What is the length of \overline{BD} ?



12. In $\triangle ADC$, segment DM is drawn such that $\angle ADM = \angle ACD$. Prove that $AD^2 = (AM)(AC)$.
13. ★ Let ABC be an equilateral triangle and points F, Q , and N be such that $AF = QB = NC = 2AB/3$. Prove that the angles AFQ , NQB , and FNC are right and that FQN is an equilateral triangle.

