

Tricky Triangles

A home group activity

Directions

In each problem, some specifications of triangles are given, such as side lengths and angle measures. Find as many unique¹ triangles as you can that fit these criteria, stating their side lengths and measures of their angles, or state that no triangle like that is possible. Provide a mathematical argument that you've found all possible triangles that fit the criteria.

Be prepared to share!

Exercise 1. A triangle formed from two sides of length 1 having a 45° angle between them.

¹Unique "up to congruence" – i.e. simply moving or rotating a given triangle doesn't produce a new one.

Exercise 2. A triangle whose sides measure 8, 15, and 17.

Exercise 3. An acute triangle with side lengths 21 and 83 and with an angle with measure 30° across from the 21-length side.

Exercise 4. $\triangle ABC$ such that $\overline{AB} = 5 \cdot \overline{BC}$ and $m\angle C = 10^\circ$.

Exercise 5. An isosceles triangle one of whose base angles measures 100° .

Exercise 6. $\triangle EIU$ such that $m\angle E = 18^\circ$, $m\angle I = 95^\circ$ and $\overline{IU} = 21$.