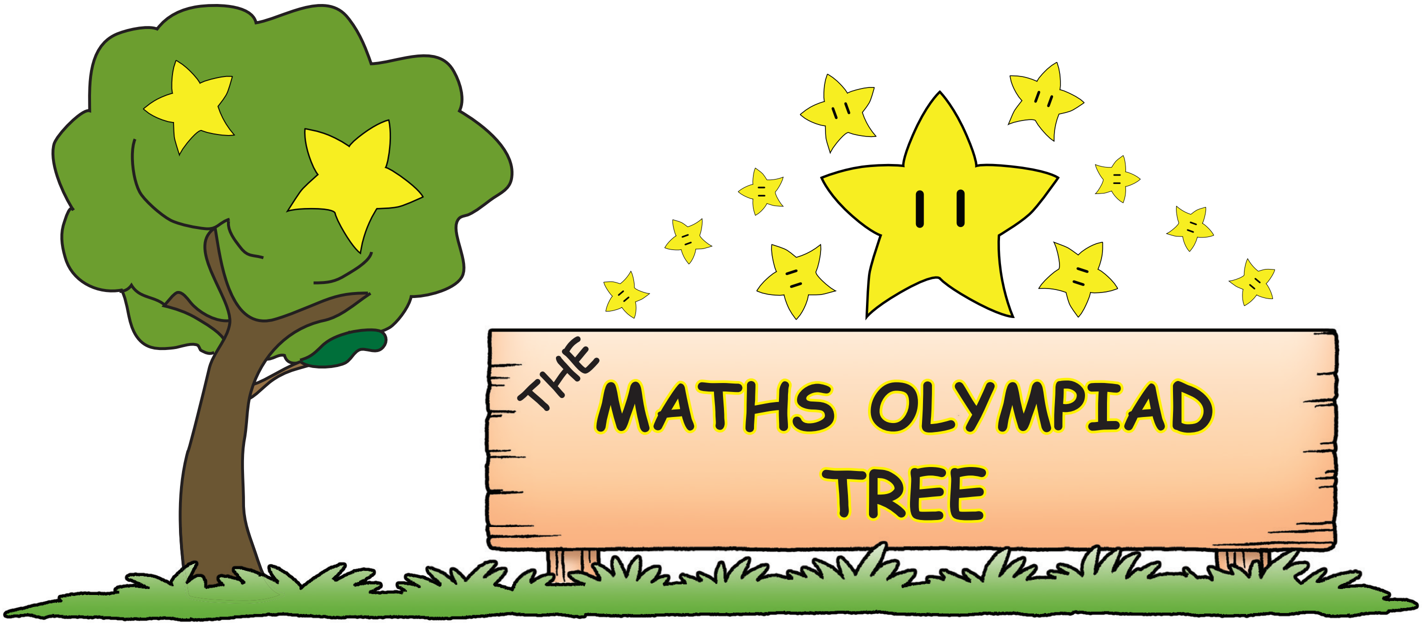
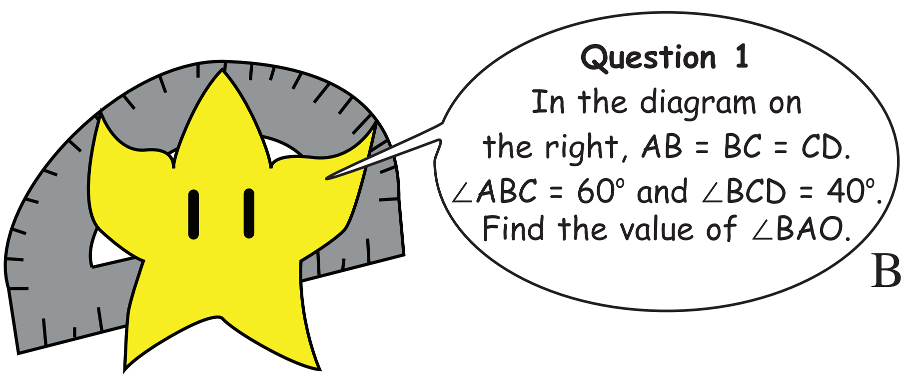
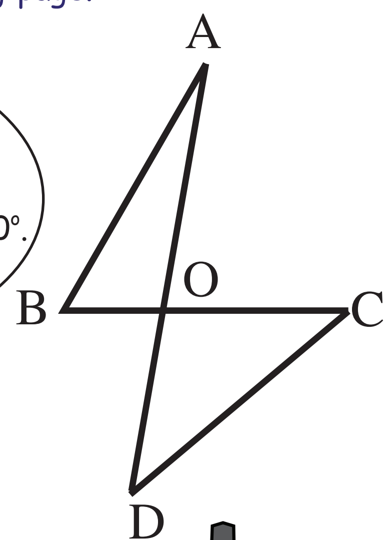
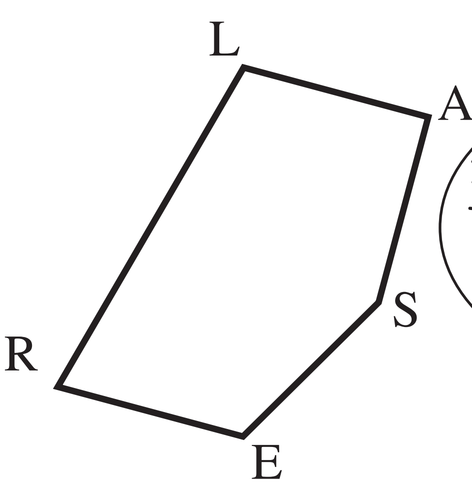
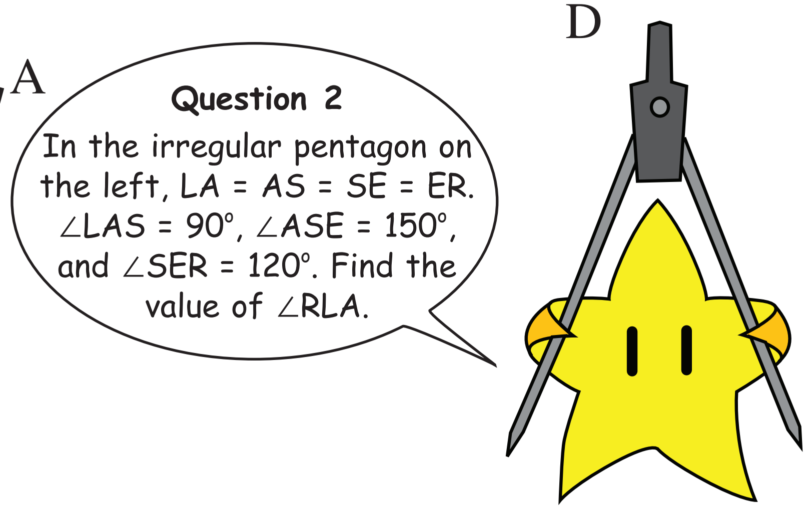


In solving problems involving angles, we sometimes have to draw extra lines to help us identify more angles. Today, **Spatial Starfruit** will teach you how to make use of additional constructed lines to uncover the subtle information. Go through the following questions and attempt to solve them on your own before reading the suggested solution on the facing page.









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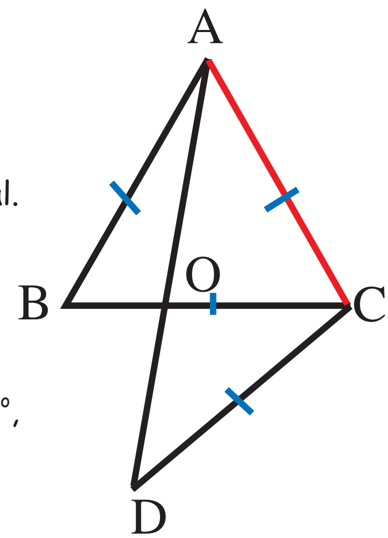
SOLUTIONS!!!

Question 1

Solution:

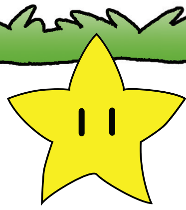
We join AC as shown on the right in red.



Since ∠ABC is 60°, and AB = BC, ΔABC is equilateral.
Thus, AC = AB = BC = CD,
∠ABC = ∠CAB = ∠BCA = 60°, and
ΔACD is isosceles.

Since ∠ACD = ∠BCA + ∠BCD = 60° + 40° = 100°,
∠CAD = (180° – 100°) ÷ 2 = 40°.

Finally, ∠BAO = ∠BAC – ∠CAD = 60° – 40° = 20°.

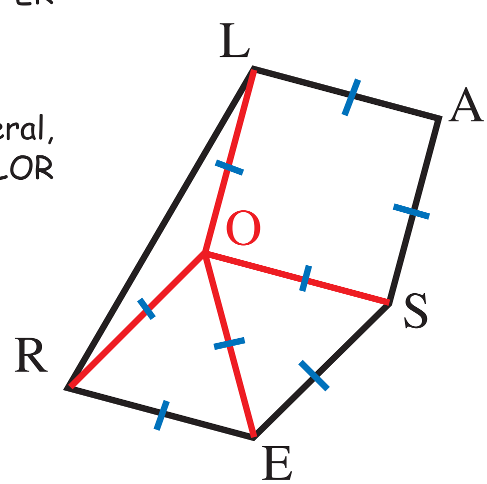


In questions which have some equal sides given, look out and construct lines to form nice angles like 60°, 90°, in order to form equilateral triangles, squares and isosceles triangles. This approach can often help us solve the problems.

Question 2

Solution:

Locate Point O in the figure such that EO = ER and ∠OER = 60°, and join O to R, S and L.



Notice that ΔROE and ΔSOE are both equilateral, while ASOL is a square. Thus, OL = OR and ΔLOR is isosceles.

Now, ∠ROE = ∠SOE = 60° and ∠SOL = 90°.
Thus, ∠LOR = (360° – 90° – 60° – 60°)
= 150° (Angles at a point).
So, ∠OLR = (180° – 150°) ÷ 2 = 15°.

Finally, ∠RLA = ∠OLR + ∠OLA = 15° + 90° = 105°.