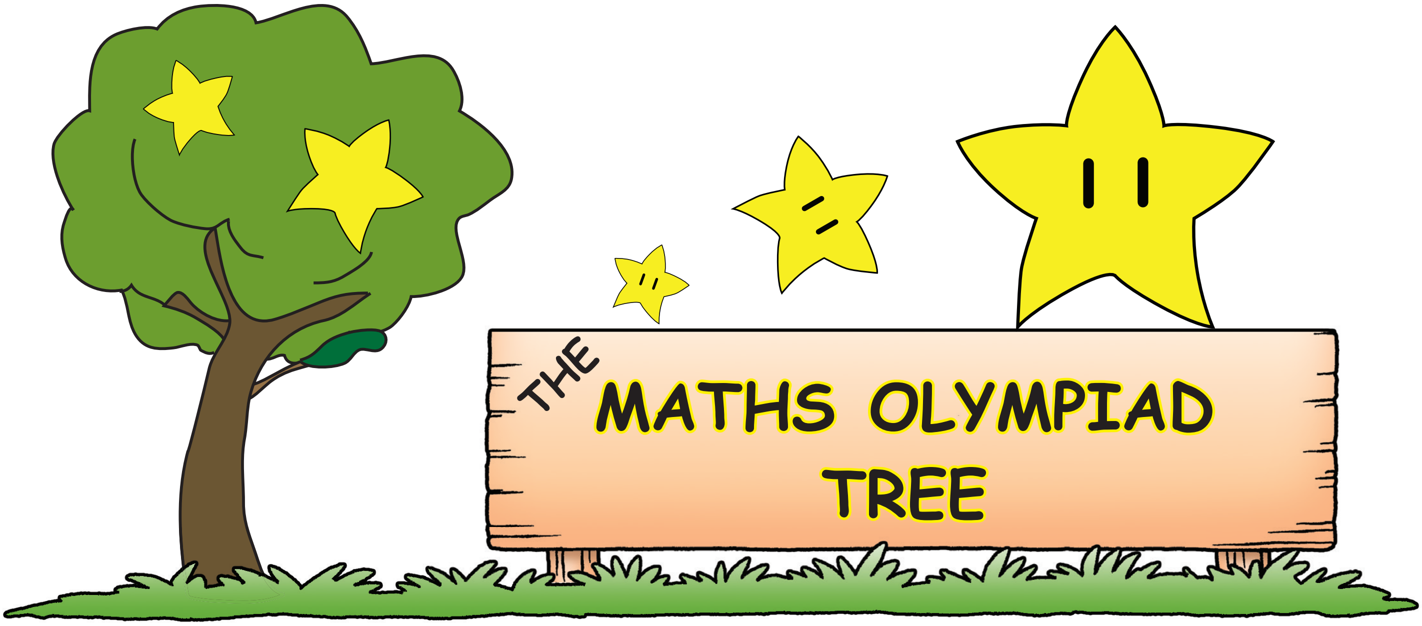
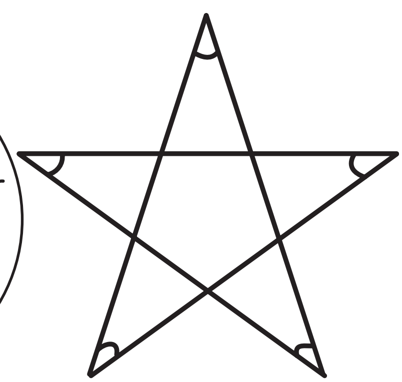
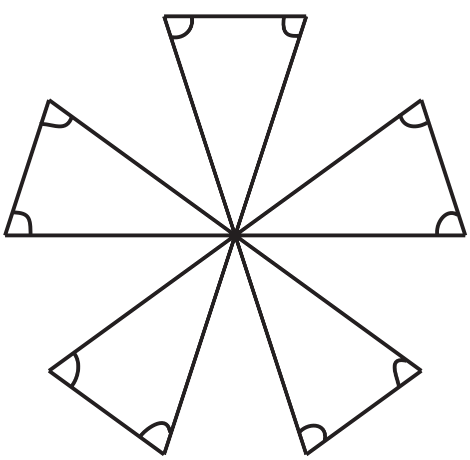


How can starfruit slices grow on trees? Well, in the magical Maths Olympiad Tree, they can! Today, we visit **Spatial Starfruit**, who likes to solve questions involving shapes, since he is so shapely himself! The following questions involve angles in star-shaped figures. Try to see if you can figure out the solutions to the questions.

Question 1

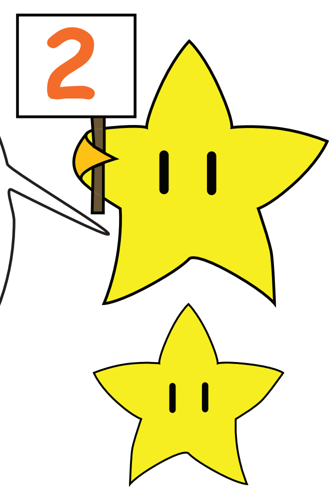
The figure on the right is made up of 5 straight line segments. Find the sum of the marked angles. (Diagram is not drawn to scale)





Question 2

The diagram on the left has 5 concurrent straight line segments. Find the sum of the marked angles. (Diagram is not drawn to scale)

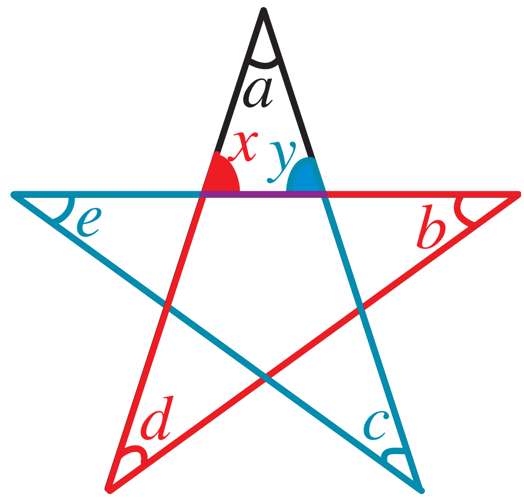


SOLUTIONS!!!

Question 1

Solution:

We first label the angles as a, b, c, d, e, as shown in the diagram to the right.



Observe the red triangle first. The sum of angles b and d is equal to the shaded red angle x(1 exterior angle = 2 interior opposite triangles).

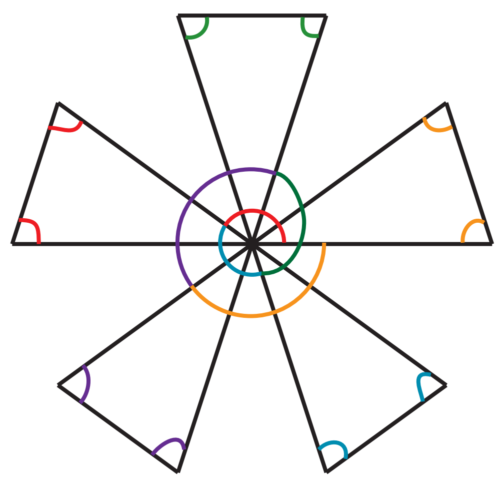
Similarly, the sum of blue angles c and e is equal to the shaded blue angle y for the very same reason.

Since $b + d = x$, and $c + e = y$, we have $a + b + c + d + e = a + x + y$. However, $a + x + y = 180°$(sum of angles in a triangle). Thus, our required sum of the marked angles, $a + b + c + d + e = 180°$.

Question 2

Solution:

Again, we make use of the property (1 exterior angle = 2 interior opposite angles) to solve this problem.



Looking at the diagram on the right, the sum of the two small red marked angles is equal to the big red angle at the centre by this property. The same applies for each of the different coloured angles.

Hence, we can see that the sum of all the small marked angles required is equal to the angles at the centre. The angles at the centre form 2 complete rounds, which gives a total of $360° \times 2 = 720°$.