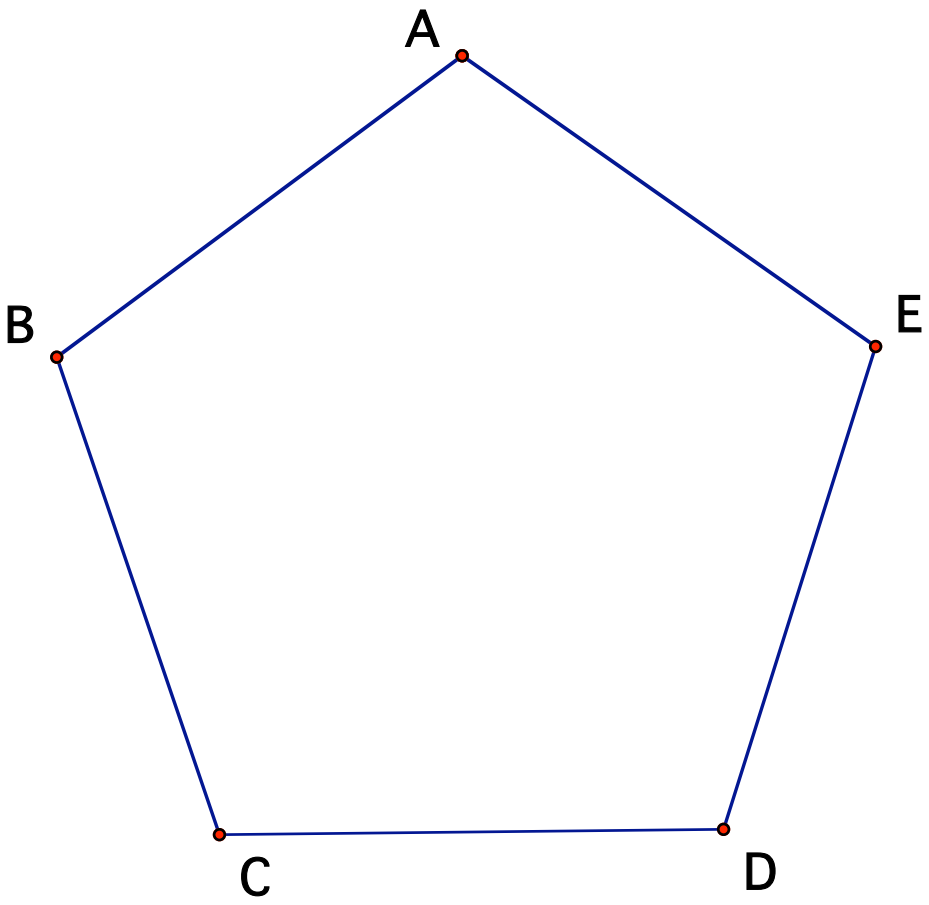
START with either PAGE 1 (pentagon) or PAGE 2 (heptagon) following the instructions for your group.

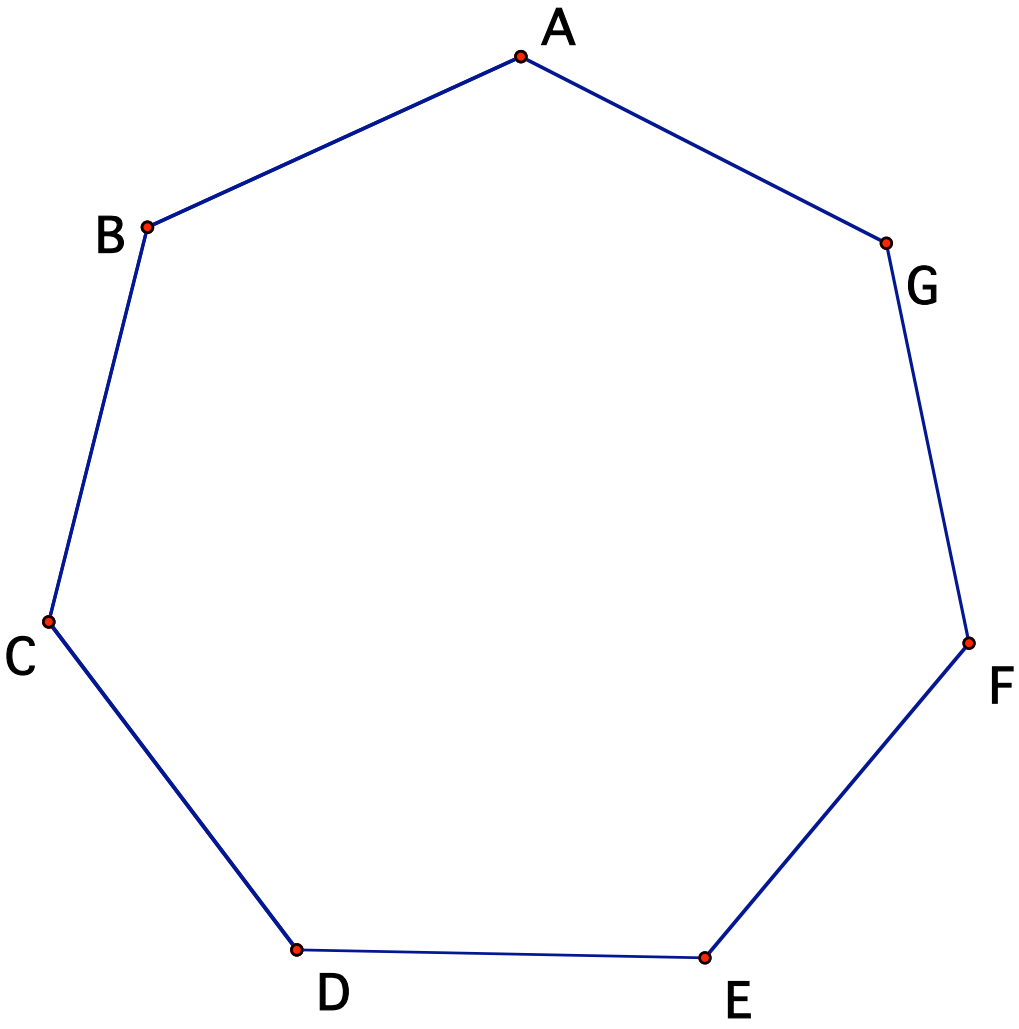
Draw the segments from vertex A to each of the other vertices of the pentagon. This dissects the pentagon into 3 triangles, each with a vertex at A. Cut out the triangles and compare the angles with vertex A.

What do you observe? What is the size of each angle?

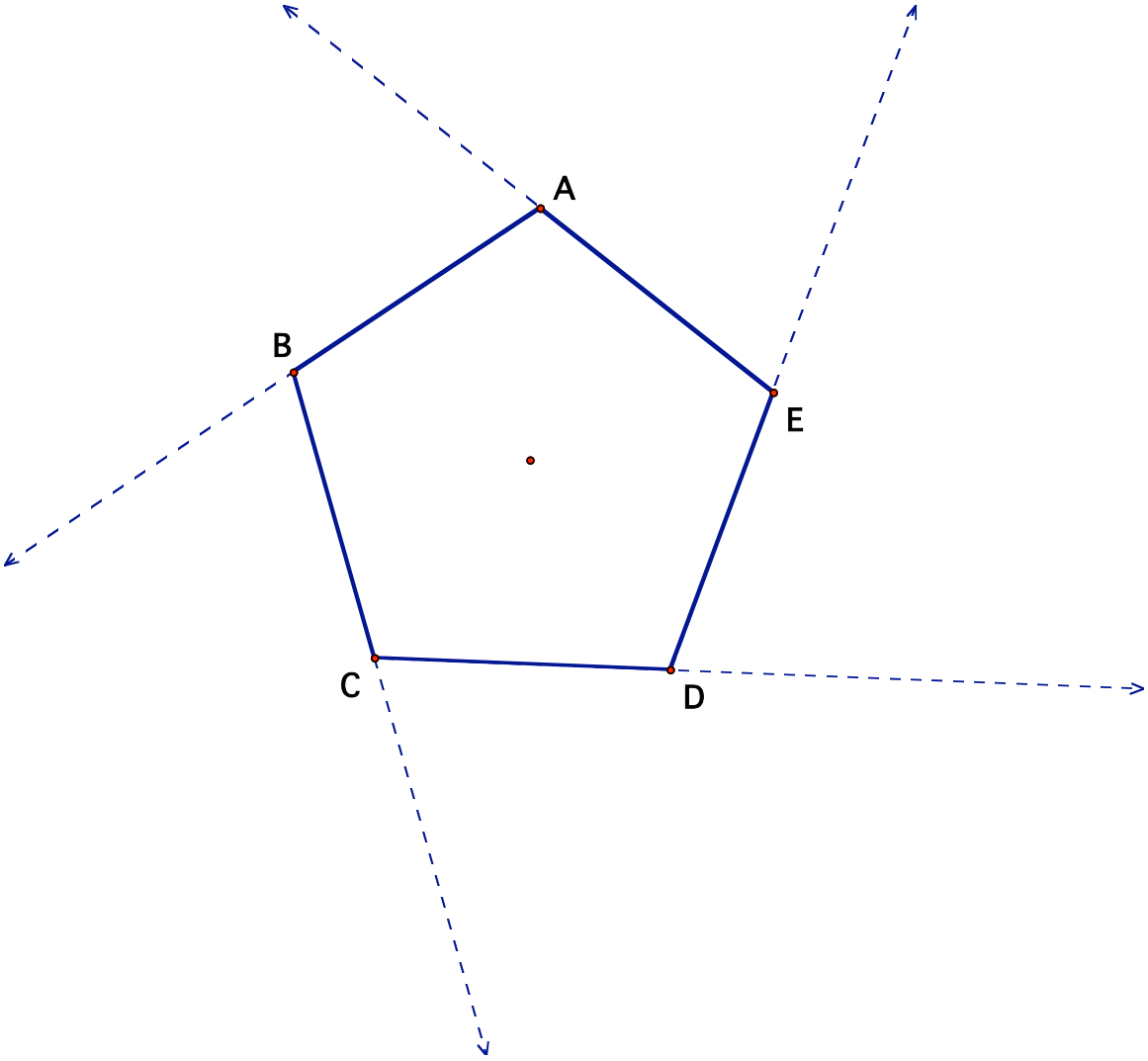


Draw the segments from vertex A to each of the other vertices of the heptagon. This dissects the heptagon into 4 triangles, each with a vertex at A. Cut out the triangles and compare the angles with vertex A.

What do you observe? What is the size of each angle?



Cut out the five exterior angles of this regular pentagonal in this figure. Compare the sizes of the angles. Slide each exterior angle from its original position so the vertex is moved to the center of the polygon. What is the sum of the exterior angles?



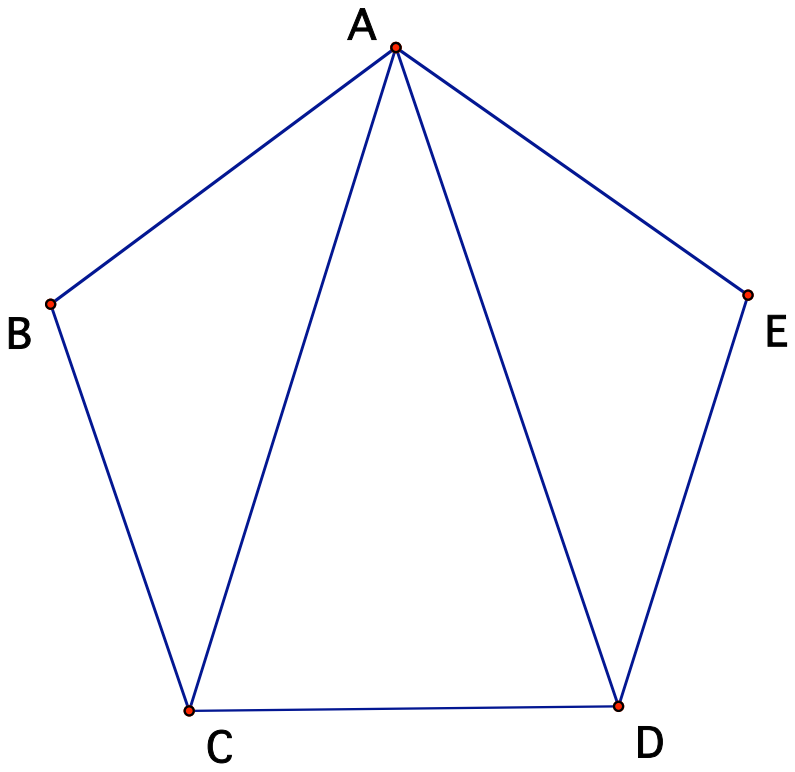
Note: The sum of the interior angles of a convex polygon can be computed from knowing the sum of the interior angles of a triangle. Then since each exterior angle is the supplement of an interior angle, the sum of the exterior angles can be computed from this.

Hint: Use 1 Straight Angle as your unit instead of degrees, and the computation is much simpler.

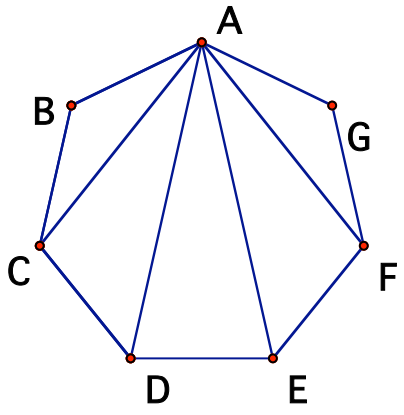
The angles in a pentagon

We will do these angles together.

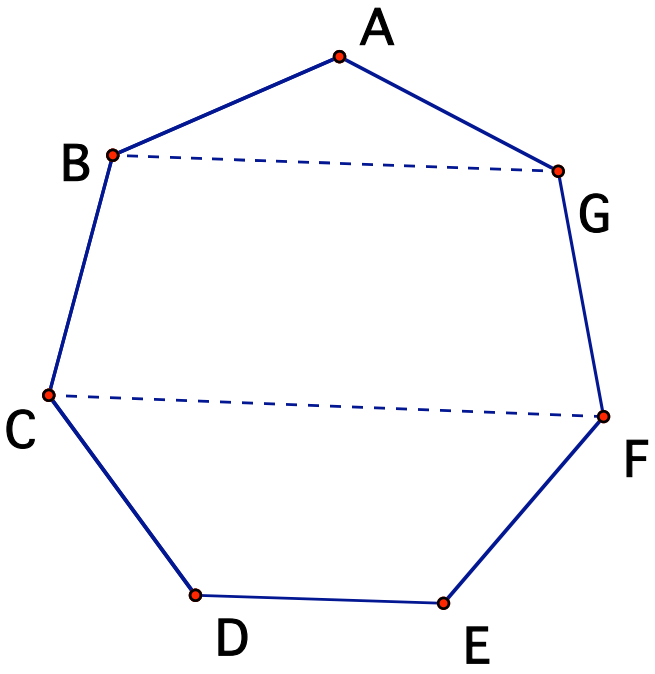
Start with the fact that any exterior angle of a regular pentagon = (2/5) Straight Angles. Then find the measure of other angles, step by step and label them. Use 1 Straight Angle as your unit and use fractions and not calculators and decimals.



If you try the same idea with a heptagon, it works to find the angles of the outside triangles but it is not so simple to find the angles of the others. We will try a different approach.



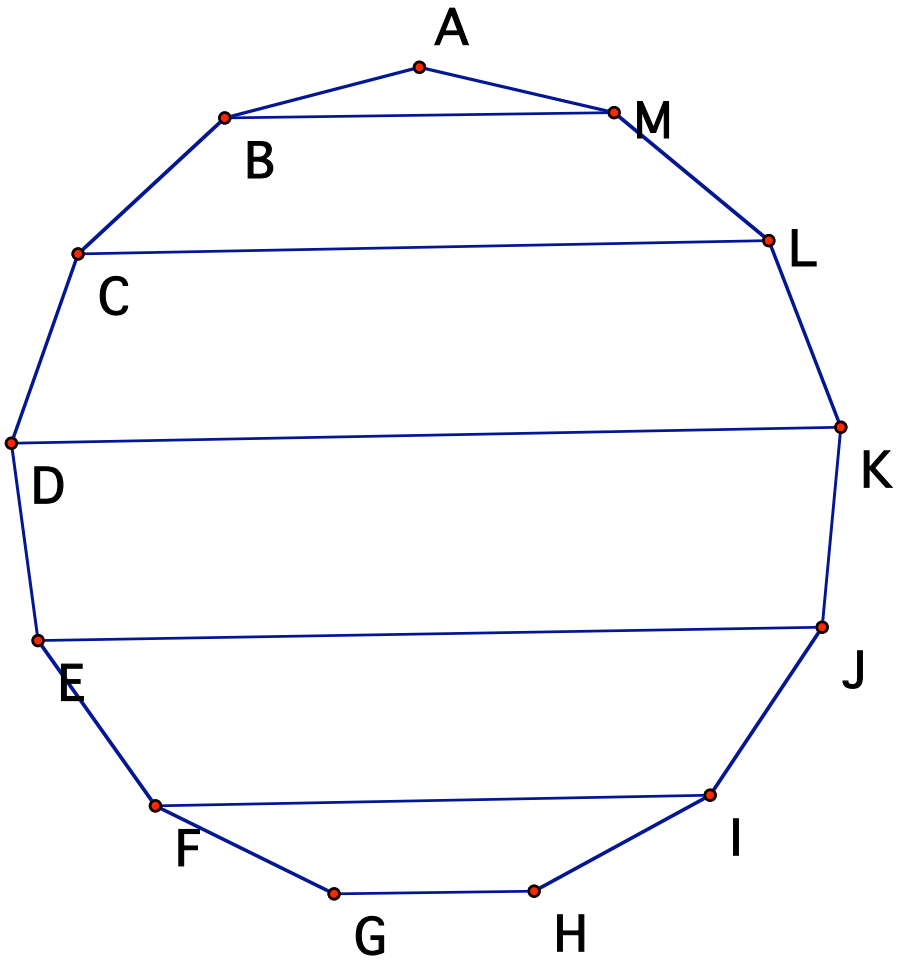
In this figure of a regular polygon and some diagonals, draw one or more exterior angles and label the measure of the angle (with unit = 1 Straight Angle). The find all the measures of all the other angles and label them.



Now use this figure to find the measure of the angles

BAC, BAD, BAE, BAF, BAG

In this figure of a regular polygon and some diagonals, draw one or more exterior angles and label the measure of the angle (with unit = 1 Straight Angle). The find all the measures of all the other angles and label them.



Now use this figure to find the measure of the angles

BAC, BAD, BAE, BAF, BAG, etc.

Are we done? Not quite. In the figures above, we have investigated figures with an odd number of sides and so have found every possible multiple of the angle (1/n)Straight Angle.

But for regular polygons with an even number of sides, we need two figures to find these angles. But the idea is the same. Here is an example: label the angle measures in these two figures.