

SKETCH AND INVESTIGATE

- 01** The sum of the measures of the exterior angles in any convex polygon is 360° . Make sure students try this investigation with other polygons in addition to the pentagon shown in the example. They could actually manipulate their pentagon into a quadrilateral or triangle, making one or more angle measures disappear.

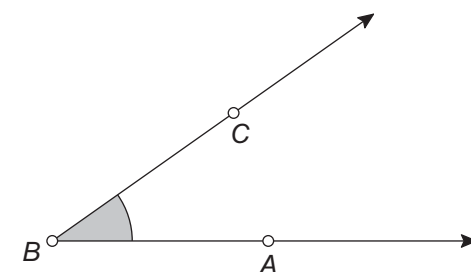
If students print out their polygons with the exterior angles, they can actually cut out the exterior angles and rearrange them around a single point to show that they sum to 360° .

- 02** As you dilate the figure toward any point, the polygon will shrink toward that point, leaving you with only the angles surrounding a common vertex. This has the same visual effect as zooming out from the polygon.

When the polygon appears to be the size of a point, the exterior angles appear as spokes radiating from the point, with the angle markers forming a circle around the point. This provides a visual proof that their sum is 360° , or the total number of degrees in one revolution around a point.

EXPLORE MORE

11. Interestingly, this same conjecture applies to concave polygons, too, if you consider the “exterior” angles that fall inside the polygon to be negative. To investigate this with Sketchpad, be sure to set Preferences to show angle measures in directed degrees. The figure below demonstrates how selection order determines the sign of an angle measure. If you think in terms of a rotation from one ray to the other, a counterclockwise rotation is positive and a clockwise rotation is negative.



$$m\angle ABC = 35.2^\circ$$

$$m\angle CBA = -35.2^\circ$$