



C-39 The sum of the measures of the n angles of an n -gon is $-?-$
(*Polygon Sum Conjecture*).

Take Another Look 6.1

Try one or more of these follow-up activities.



1. Use a geometry computer program or patty papers to investigate the sum of the angle measures in different polygons.

2. Draw a polygon onto a sheet of heavy paper. Cut the polygon and tear off its angles. On another sheet of paper, draw a line and a point on the line. Arrange the torn-off angles around the point. Write a paragraph that explains how this activity demonstrates the Polygon Sum Conjecture for this polygon.



3. Draw several polygons that have four or more sides. In each, draw diagonals from a single vertex. Explain how the Polygon Sum Conjecture follows logically from the Triangle Sum Conjecture. Does the Polygon Sum Conjecture apply to concave polygons?

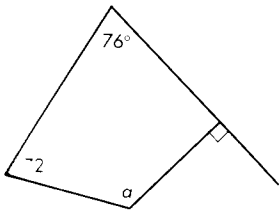


4. On a sphere, investigate the Polygon Sum Conjecture. Once you make a conjecture, explain how it is related to the Triangle Sum Conjecture on a sphere. Be sure to test your conjecture on the smallest and largest possible polygons.

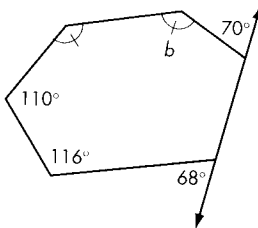
Exercise Set 6.1

Exercises 1–6, use your conjectures to determine each lettered angle measure.
You might find it helpful to trace the more complicated diagrams.

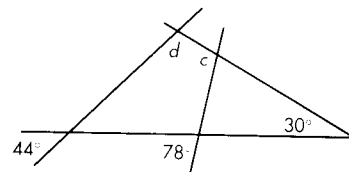
1. $a = -?-$



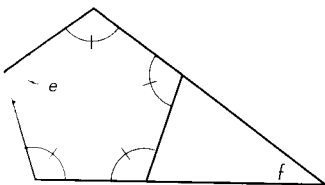
2. $b = -?-$



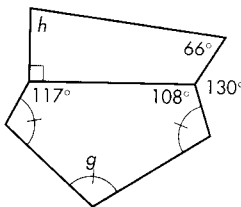
3.* $c = -?-$
 $d = -?-$



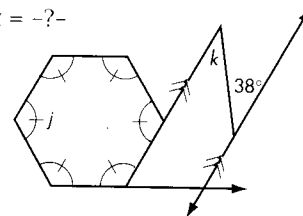
$c = -?-$
 $f = -?-$



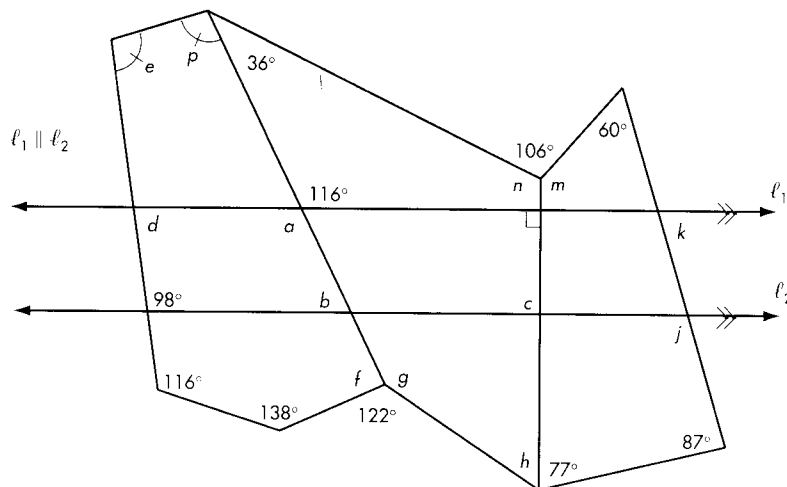
5.* $g = -?-$
 $h = -?-$



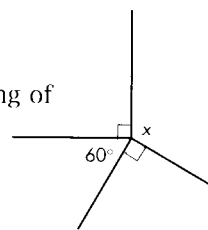
6. $j = -?-$
 $k = -?-$



7. Trace the figure below. Calculate each lettered angle measure.



8. What is the sum of the measures of the angles of a decagon?
9. What is the sum of the measures of the angles of a 25-gon?
10. The figure at right is a detail of one vertex of the tiling shown at the beginning of this lesson. Find the missing angle measure x .
- 11.* How many sides does a polygon have if the sum of its angle measures is 2700° ?
- 12.* Recall that an equiangular polygon is a polygon with all angles equal in measure. What is the measure of each angle of an equiangular decagon?



13. Archaeologist Ertha Diggs has uncovered a piece of a ceramic plate. The original plate appears to have been in the shape of a regular polygon. If the original plate was a regular 16-gon, it was probably a ceremonial dish from the third century. If it was a regular 18-gon, it was probably a palace dinner plate from the twelfth century. Ertha measures each of the sides of her piece and finds that each side has the same length. She then conjectures that all the sides of the original whole plate had the same length. She measures each of the angles of her piece and finds that they all have the same measure. She then conjectures that all the angles of the original whole plate had equal measures. If each angle measures 160° , from what century did the plate originate?

