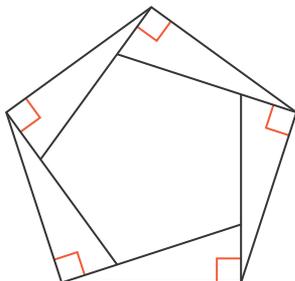




UNDERSTAND

- Construct Arguments** Write a proof of the Polygon Interior Angle-Sum Theorem.
- Make Sense and Persevere** What are the measures of the angles in the right triangles formed by the two regular pentagons shown?

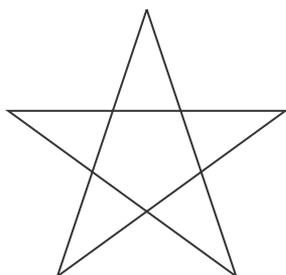


- Reason** Explain why a regular polygon cannot have an interior angle that is 40° .
- Error Analysis** Jayesh makes the calculation shown to find the measure of each interior angle of a regular nonagon. What is his error?

Sum of measure of exterior angles:
 $180 \cdot 9 = 1,620$
 Sum of measure of interior angles:
 $1,620 \div 9 = 180$



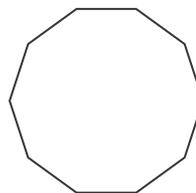
- Construct Arguments** Write a proof of the Polygon Exterior Angle-Sum Theorem.
- Higher Order Thinking** The star shown is constructed by extending each side of a regular pentagon. Explain why the surrounding triangles are isosceles and congruent.



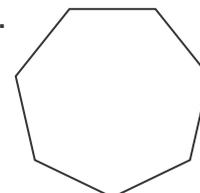
PRACTICE

For Exercises 17 and 18, find the sum of the interior angles and the measure of each angle for the given regular polygon. SEE EXAMPLES 1 AND 2

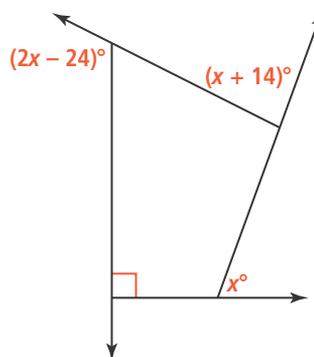
17.



18.

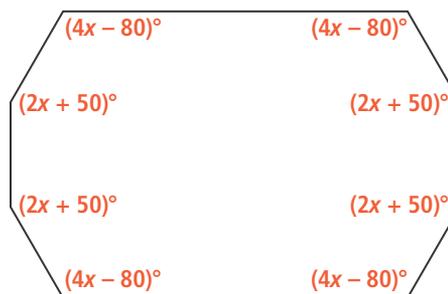


- How many sides does a regular polygon have if the measure of each interior angle is 160° ?
SEE EXAMPLES 1 AND 2
- What is the measure of each exterior angle of a regular polygon with 72 sides? SEE EXAMPLE 3
- How many sides does a regular polygon with an exterior angle measure of 60° have?
SEE EXAMPLE 3
- What is the value of x ? What is the measure of each exterior angle? SEE EXAMPLE 4



For Exercises 23 and 24, find the value of x and the measure of each interior angle. SEE EXAMPLE 5

23.

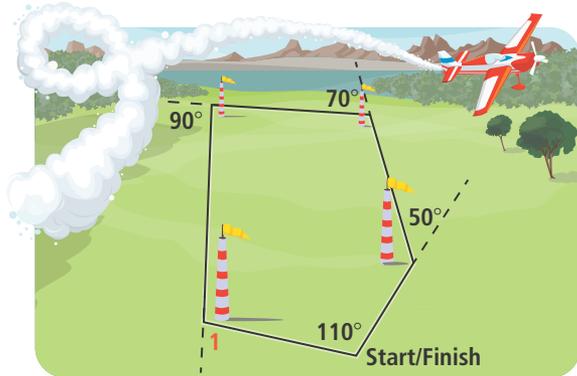


24.

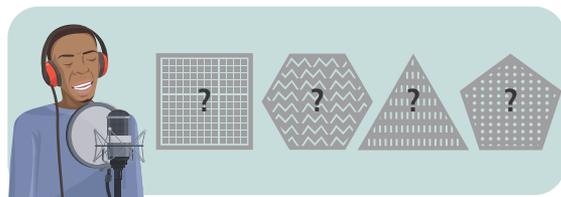


APPLY

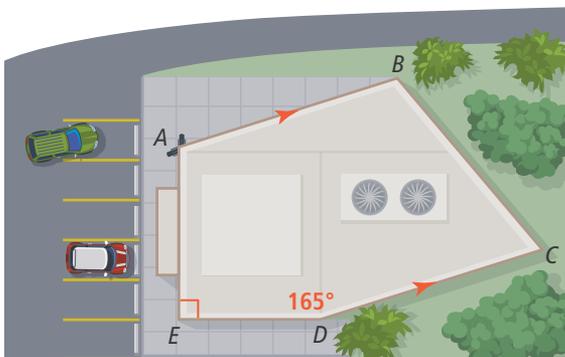
25. **Model With Mathematics** An airplane is navigating a polygon-shaped course. Each turn is labeled with the measure of the external angle at the striped post. What is $m\angle 1$?



26. **Use Structure** A music producer needs to soundproof a wall with nonoverlapping foam panels consisting of regular polygons. When placed, there cannot be any space between the figures. Which of the regular polygons can she use? Explain.

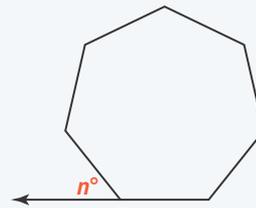


27. **Mathematical Connections** Ricardo wants to install two security cameras at point A so the parking lot from side \overline{AE} to side \overline{AB} of the building can be monitored. Can he use two cameras, both with a field of view of 110° , installed at point A ? Explain. If not, what is the minimum field of view that each camera should have?



ASSESSMENT PRACTICE

28. Match the number of sides of a regular polygon with the measure of each interior angle.
- | | |
|---------|----------|
| I. 4 | A. 120 |
| II. 6 | B. 157.5 |
| III. 16 | C. 160 |
| VI. 18 | D. 90 |
29. **SAT/ACT** Suppose the figure below is a regular polygon. What is the value of n ? Round to the nearest whole number.



- (A) 45 (B) 51 (C) 129 (D) 135

30. **Performance Task** The tables of a conference room are the same size, and all have the shape of a trapezoid. The conference coordinator wants to arrange the tables so they form a regular polygon.



Part A Can the tables be arranged to form a regular polygon? Explain.

Part B If they can be arranged to form a regular polygon, how many tables are needed? If not, what should the measure of the 120° angle be changed to so that the tables can be arranged to form a regular polygon?

Part C What should the measures of the angles of the tables be if they can be arranged to form a regular pentagon?