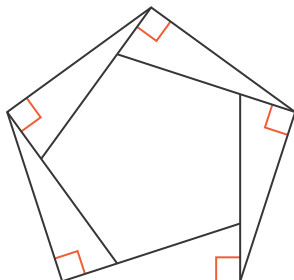




## UNDERSTAND

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



13. **Reason** Explain why a regular polygon cannot have an interior angle that is  $40^\circ$ .
14. **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:

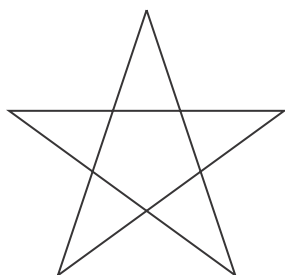
$$180 \cdot 9 = 1,620$$

Sum of measure of  
interior angles:

$$1,620 \div 7 = 231$$



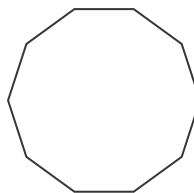
15. **Construct Arguments** Write a proof of the Polygon Exterior Angle-Sum Theorem.
16. **Higher Order Thinking** The star shown is constructed by extending each side of a regular pentagon. Explain why the surrounding triangles are isosceles and congruent.



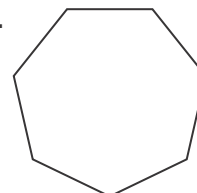
## PRACTICE

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

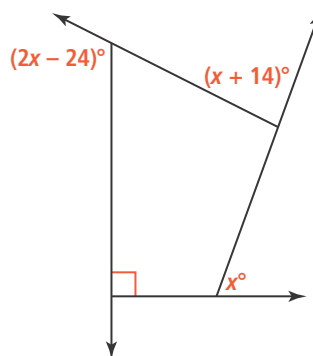
17.



18.

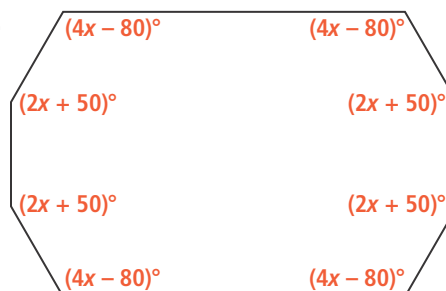


19. How many sides does a regular polygon have if the measure of each interior angle is  $160^\circ$ ?  
SEE EXAMPLES 1 AND 2
20. What is the measure of each exterior angle of a regular polygon with 72 sides? SEE EXAMPLE 3
21. How many sides does a regular polygon with an exterior angle measure of  $60^\circ$  have?  
SEE EXAMPLE 3
22. 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.



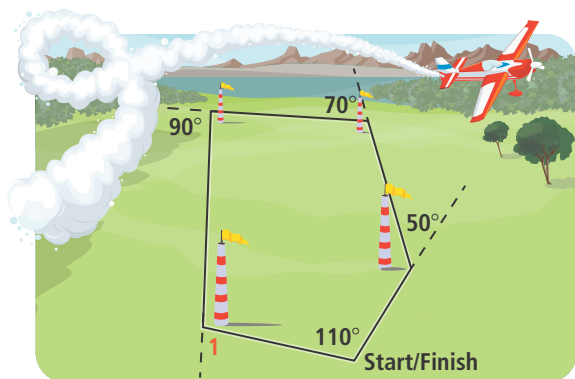
24.



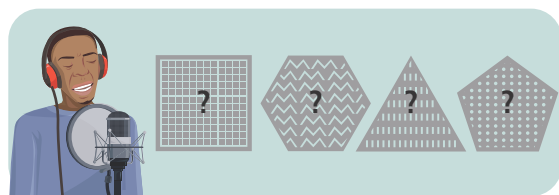


**APPLY**

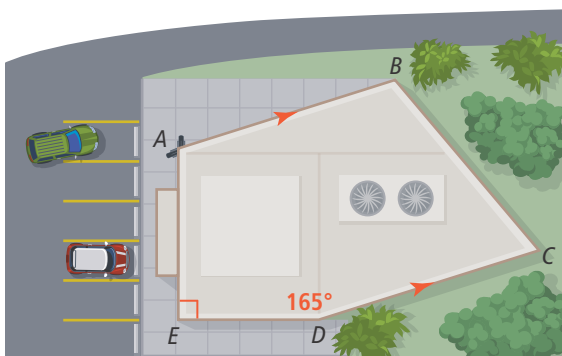
25. **Model With Mathematics** An airplane is navigating a polygon-shaped course. Each turn is labeled with the measure of the external angle at the striped post. What is  $m\angle 1$ ?



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  $110^\circ$ , installed at point  $A$ ? Explain. If not, what is the minimum field of view that each camera should have?

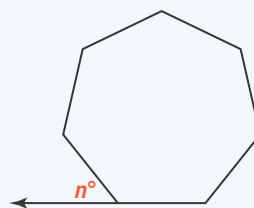


**ASSESSMENT PRACTICE**

28. Match the number of sides of a regular polygon with the measure of each interior angle.

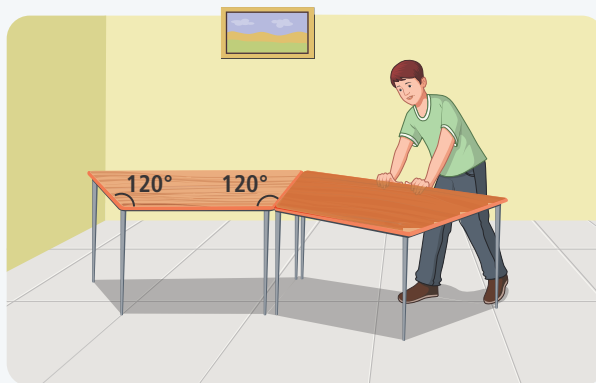
- |         |          |
|---------|----------|
| I. 4    | A. 120   |
| II. 6   | B. 157.5 |
| III. 16 | C. 160   |
| VI. 18  | D. 90    |

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  $120^\circ$  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?