

6-1

Practice - ANSWERS ON THIS PAGE. WORK ON SEPARATE PAGE!

Angles of Polygons

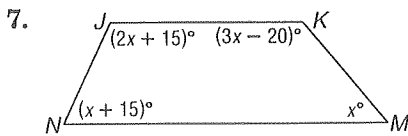
Find the sum of the measures of the interior angles of each convex polygon.

1. 11-gon _____ 2. 14-gon _____ 3. 17-gon _____

The measure of an interior angle of a regular polygon is given. Find the number of sides in each polygon.

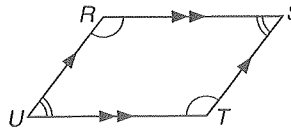
4. 144 _____ 5. 156 _____ 6. 160 _____

Find the measure of each interior angle using the given information.



$\angle J$: _____ $\angle L$: _____
 $\angle K$: _____ $\angle M$: _____

8. quadrilateral $RSTU$ with
 $m\angle R = 6x - 4$, $m\angle S = 2x + 8$



$\angle R$: _____ $\angle T$: _____
 $\angle S$: _____ $\angle U$: _____

Find the measures of an interior angle and an exterior angle for each regular polygon. Round to the nearest tenth if necessary.

9. 16-gon 10. 24-gon 11. 30-gon
 INT: _____ EXT: _____ INT: _____ EXT: _____ INT: _____ EXT: _____

Find the measures of an interior angle and an exterior angle given the number of sides of each regular polygon. Round to the nearest tenth if necessary.

12. 14 13. 22 14. 40
 INT: _____ EXT: _____ INT: _____ EXT: _____ INT: _____ EXT: _____

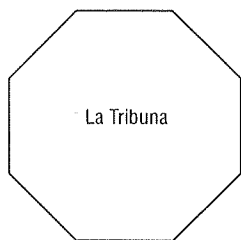
15. **CRYSTALLOGRAPHY** Crystals are classified according to seven crystal systems. The basis of the classification is the shapes of the faces of the crystal. Turquoise belongs to the triclinic system. Each of the six faces of turquoise is in the shape of a parallelogram. Find the sum of the measures of the interior angles of one such face.

6-1 Word Problem Practice

Angles of Polygons

*ANSWERS ON THIS PAGE
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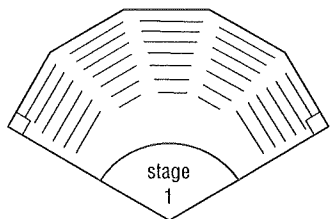
- 1. ARCHITECTURE** In the Uffizi gallery in Florence, Italy, there is a room built by Buontalenti called the Tribune (*La Tribuna* in Italian). This room is shaped like a regular octagon.



What angle do consecutive walls of the Tribune make with each other?

- 2. BOXES** Jasmine is designing boxes she will use to ship her jewelry. She wants to shape the box like a regular polygon. In order for the boxes to pack tightly, she decides to use a regular polygon that has the property that the measure of its interior angles is half the measure of its exterior angles. What regular polygon should she use?
- _____

- 3. THEATER** A theater floor plan is shown in the figure. The upper five sides are part of a regular dodecagon.



Find $m\angle 1$. _____

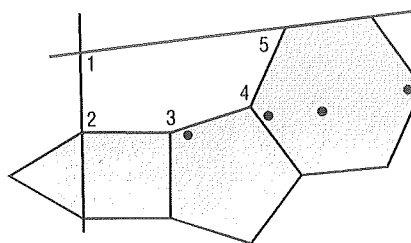
- 4. ARCHEOLOGY** Archeologists unearthed parts of two adjacent walls of an ancient castle.



Before it was unearthed, they knew from ancient texts that the castle was shaped like a regular polygon, but nobody knew how many sides it had. Some said 6, others 8, and some even said 100. From the information in the figure, how many sides did the castle really have?

POLYGON PATH For Exercises 5–7, use the following information.

In Ms. Ricketts' math class, students made a "polygon path" that consists of regular polygons of 3, 4, 5, and 6 sides joined together as shown.



5. Find $m\angle 2$ and $m\angle 5$. $\angle 2$: _____

$\angle 5$: _____

6. Find $m\angle 3$ and $m\angle 4$. $\angle 3$: _____

$\angle 4$: _____

7. What is $m\angle 1$? $\angle 1$: _____

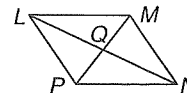
6-2

Practice

Parallelograms

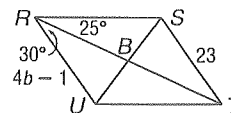
ANSWERS ON THIS PAGE
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Complete each statement about $\square LMNP$. Justify your answer.



1. $\overline{LQ} \cong$ _____ ; _____
2. $\angle LMN \cong$ _____ ; _____
3. $\triangle LMP \cong$ _____ ; _____
4. $\angle NPL$ is supplementary to _____ ; _____
5. $\overline{LM} \cong$ _____ ; _____

ALGEBRA Use $\square RSTU$ to find each measure or value.



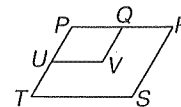
6. $m\angle RST =$ _____
7. $m\angle STU =$ _____
8. $m\angle TUR =$ _____
9. $b =$ _____

COORDINATE GEOMETRY Find the coordinates of the intersection of the diagonals of parallelogram $PRYZ$ given each set of vertices.

10. $P(2, 5), R(3, 3), Y(-2, -3), Z(-3, -1)$
11. $P(2, 3), R(1, -2), Y(-5, -7), Z(-4, -2)$

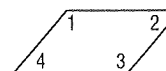
12. PROOF Write a paragraph proof of the following.

Given: $\square PRST$ and $\square PQVU$
Prove: $\angle V \cong \angle S$



ON SEPARATE SHEET

13. CONSTRUCTION Mr. Rodriguez used the parallelogram at the right to design a herringbone pattern for a paving stone. He will use the paving stone for a sidewalk. If $m\angle 1$ is 130, find $m\angle 2, m\angle 3,$ and $m\angle 4$.



$\angle 2:$ _____ $\angle 3:$ _____ $\angle 4:$ _____

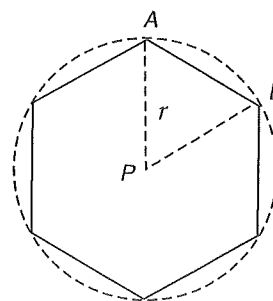
6-1 Enrichment

ANSWERS ON THIS SHEET
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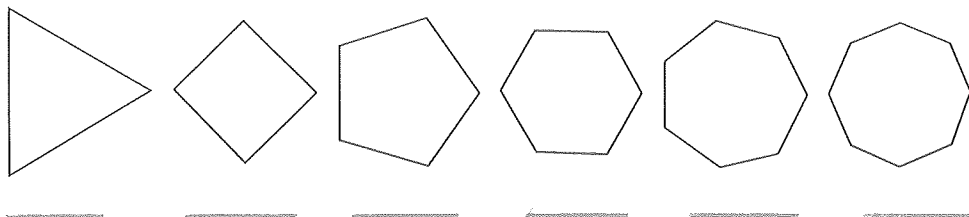
Central Angles of Regular Polygons

You have learned about the interior and exterior angles of a polygon. Regular polygons also have **central angles**. A central angle is measured from the center of the polygon.

The center of a polygon is the point equidistant from all of the vertices of the polygon, just as the center of a circle is the point equidistant from all of the points on the circle. The central angle is the angle drawn with the vertex at the center of the circle and the sides of angle drawn through consecutive vertices of the polygon. One of the central angles that can be drawn in this regular hexagon is $\angle APB$. You may remember from making circle graphs that there are 360° around the center of a circle.



- By using logic or by drawing sketches, find the measure of the central angle of each regular polygon.



- Make a conjecture about how the measure of a central angle of a regular polygon relates to the measures of the interior angles and exterior angles of a regular polygon.

- CHALLENGE** In obtuse $\triangle ABC$, \overline{BC} is the longest side. \overline{AC} is also a side of a 21-sided regular polygon. \overline{AB} is also a side of a 28-sided regular polygon. The 21-sided regular polygon and the 28-sided regular polygon have the same center point P . Find n if \overline{BC} is a side of a n -sided regular polygon that has center point P .

(Hint: Sketch a circle with center P and place points A , B , and C on the circle.)

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