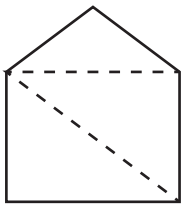
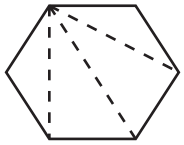
7.1 Start Thinking

The polygon in the diagram has been formed by adjoining triangles. Use your knowledge of the sum of the measures of the interior angles of a triangle to determine the sum of the measures of the interior angles of the polygon.

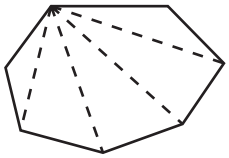
1. Pentagon



2. Hexagon



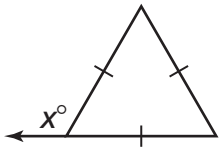
3. Heptagon



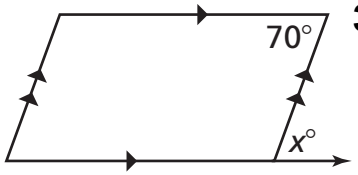
7.1 Warm Up

Find the value of *x* in the diagram.

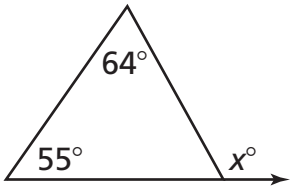
1.



2.



3.



7.1 Cumulative Review Warm Up

Write an equation of the perpendicular bisector of the segment with endpoints *P* and *Q*.

1. $P(-3, -2), Q(5, -2)$

2. $P(5, 0), Q(5, -2)$

3. $P(7, -4), Q(3, 2)$

4. $P(-8, 8), Q(6, 3)$

Name _____ Date _____

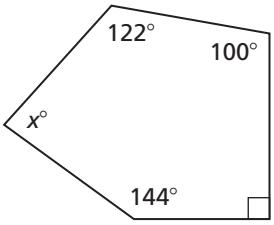
7.1 Practice A

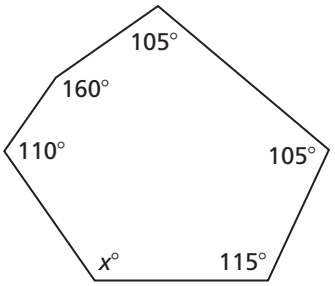
1. Find the sum of the measures of the interior angles of a heptagon.

2. The sum of the measures of the interior angles of a convex polygon is $3060°$. Classify the polygon by the number of sides.

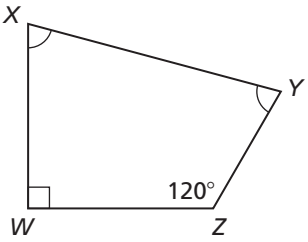
3. Find the measure of each interior and exterior angle of a regular 30-gon.

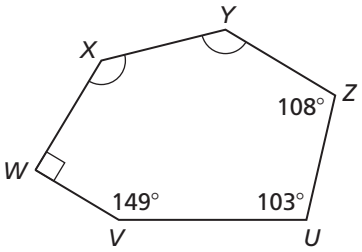
In Exercises 4 and 5, find the value of *x*.

4. 

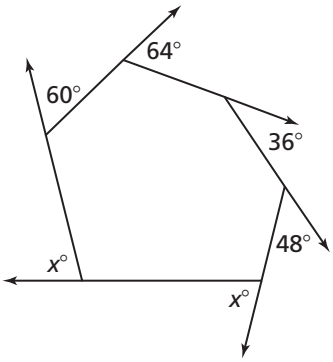
5. 

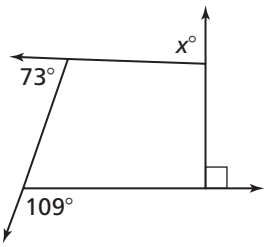
In Exercises 6 and 7, find the measures of $\angle X$ and $\angle Y$.

6. 

7. 

In Exercises 8 and 9, find the value of *x*.

8. 

9. 

10. A pentagon has three angles that are congruent and two other angles that are supplementary to each other. Find the measure of each of the three congruent angles in the pentagon.

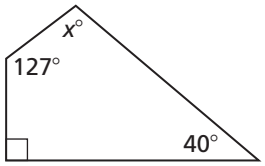
11. You are designing an amusement park ride with cars that will spin in a circle around a center axis, and the cars are located at the vertices of a regular polygon. The sum of the measures of the angles' vertices is $6120°$. If each car holds a maximum of four people, what is the maximum number of people who can be on the ride at one time?

Name_____ Date _____

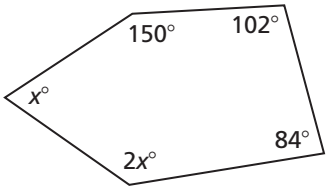
7.1 Practice B

In Exercises 1 and 2, find the value of *x*.

1.

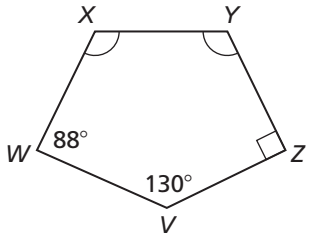


2.

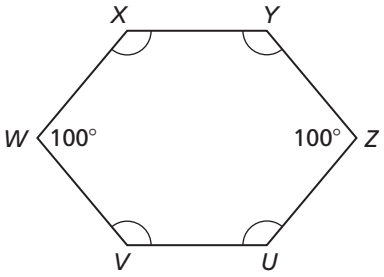


In Exercises 3 and 4, find the measures of ∠*X* and ∠*Y*.

3.

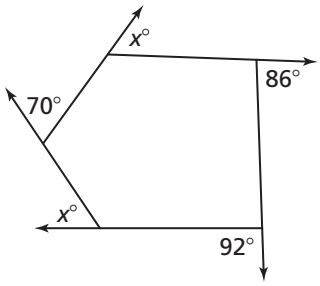


4.

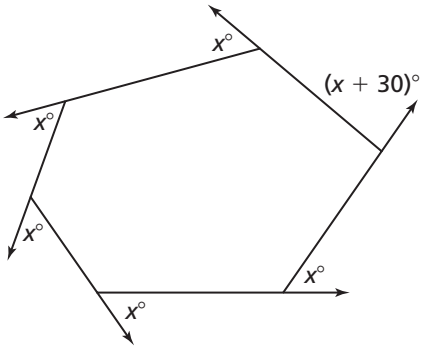


In Exercises 5 and 6, find the value of *x*.

5.



6.

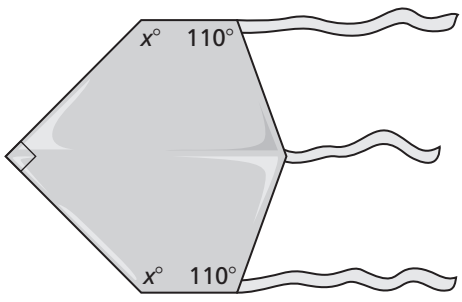


7. Find the measure of each interior angle and each exterior angle of a regular 24-gon.

8. Each exterior angle of a regular polygon has a measure of 18°. Find the number of sides of the regular polygon.

9. A polygon has two pairs of complementary interior angles and three sets of supplementary interior angles. The sum of the remaining interior angles is 1440°. How many sides does the polygon have? Explain.

10. The figure shows interior angle measures of the kite.



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

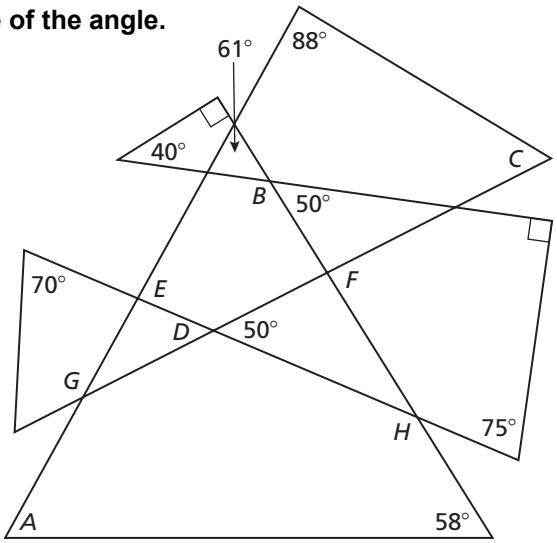
b. Find the value of *x*.

Name _____ Date _____

7.1 Enrichment and Extension

Angles of Polygons

In Exercises 1–8, use the figure to find the measure of the angle.

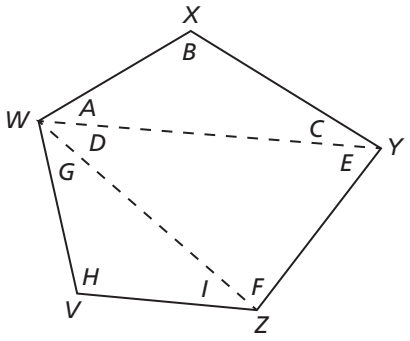


1. $\angle A$
2. $\angle B$
3. $\angle C$
4. $\angle D$
5. $\angle E$
6. $\angle F$
7. $\angle G$
8. $\angle H$

9. In an equiangular polygon, the measure of each exterior angle is 25% of the measure of each interior angle. What is the name of the polygon?

10. A and B are regular polygons and A has two more sides than B. The measure of each interior angle of A is six degrees greater than the measure of each interior angle of B. How many sides does A have?

11. The pentagon at the right has been dissected into three triangles with angles labeled as shown. Use the three triangles to prove that the sum of the interior angles of any pentagon is always 540°.



Name_____ Date _____

7.1 Puzzle Time

Why Did The Pioneers Cross The Country In Covered Wagons?

A	B	C	D	E	F
G	H	I	J		

Complete each exercise. Find the answer in the answer column. Write the word under the answer in the box containing the exercise letter.

concurrent WAS	interior TO
corner INDIANS	consecutive THEY
exterior WAIT	90° THE
midsegment GOLD	non-convex NOW
2520° A	120° WEATHER
diagonal DIDN'T	convex WANT
acute HORSE	decagon FIRST
109° FORTY	130° A
octagon TRAIN	289° FOR
100° FOR	2160° YEARS

Complete the sentence.

A. In a polygon, two vertices that are endpoints of the same side are called _____ vertices.

B. A(n) _____of a polygon is a segment that joins two nonconsecutive vertices.

C. The sum of the measures of the interior angles of a(n) _____ n-gon is $(n - 2) \bullet 180°$.

D. The sum of the measures of the _____ angles of a quadrilateral is $360°$.

E. The sum of the measures of the _____ angles of a convex polygon, one angle at each vertex, is $360°$.

Find the correct answer to the question for the interior angles of the convex polygon.

F. Two angles of a triangle measure $54°$ and $17°$. Find the measure of the third angle.

G. Find the sum of the measures of the interior angles of a 14-gon.

H. The sum of four angles in a pentagon is $440°$. Find the missing angle measure.

I. The sum of three angles in a pentagon is $320°$, and the other two angles are $(x + 30)°$ and $(x - 70)°$. Find x.

J. What regular polygon has each interior angle measuring $135°$?