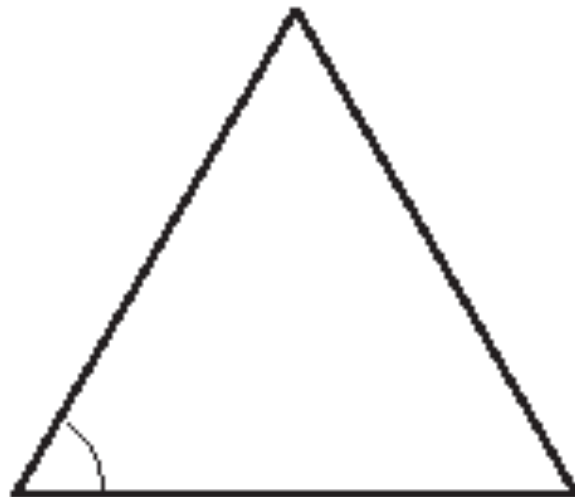


5.1 Polygon Sum Conjecture

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

1.

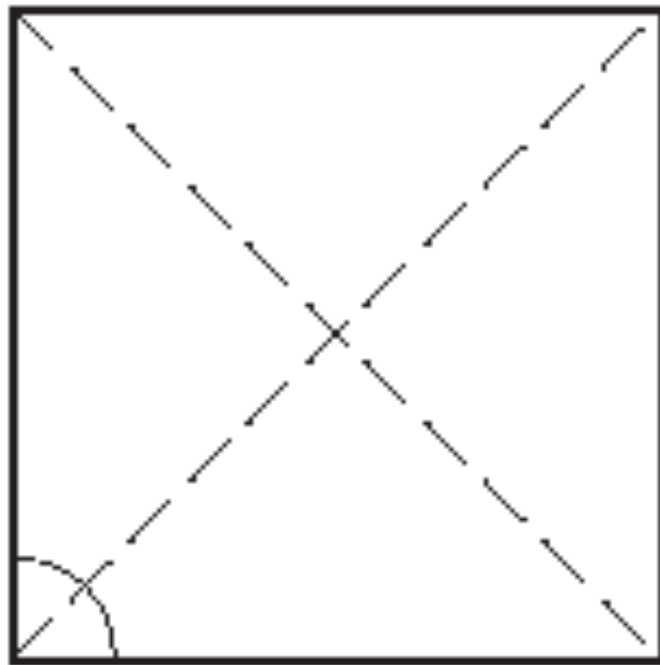


Equilateral
Triangle
 60°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

2.

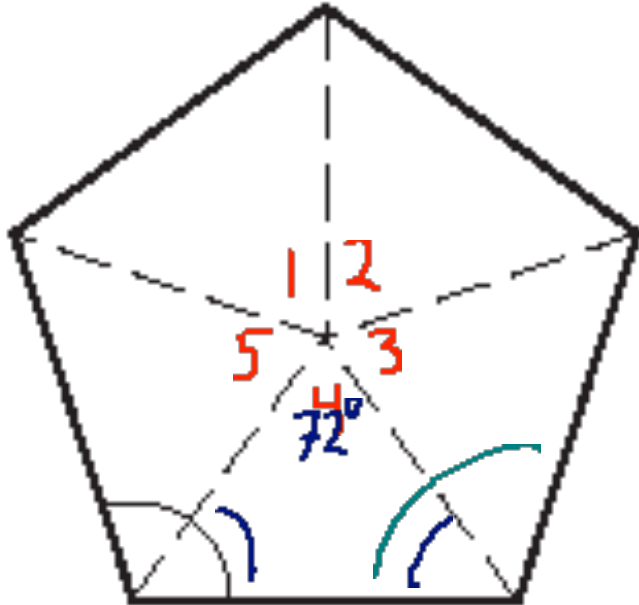


Square
 90°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

3.



$$\frac{360^\circ}{5} = 72^\circ$$

$$\frac{1}{2} (180 - 72)$$

$$\frac{1}{2} (108)$$

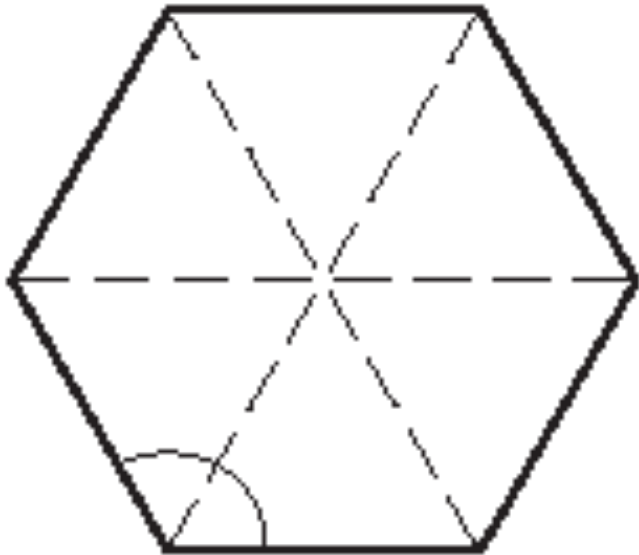
$$54$$

Regular
Pentagon
 108°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

4.

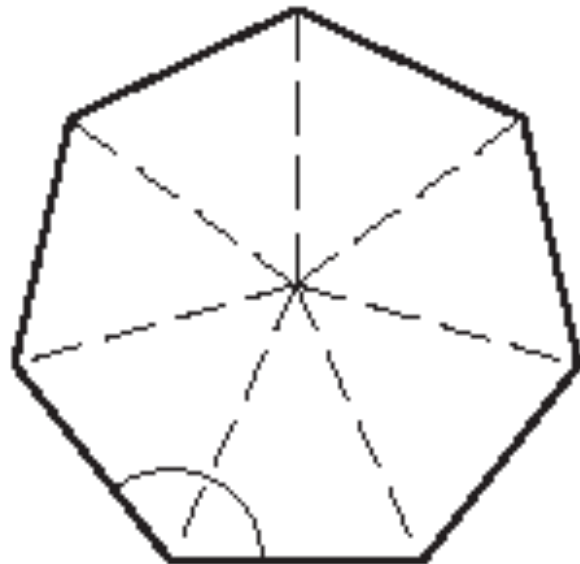


Regular
Hexagon
 120°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

5.

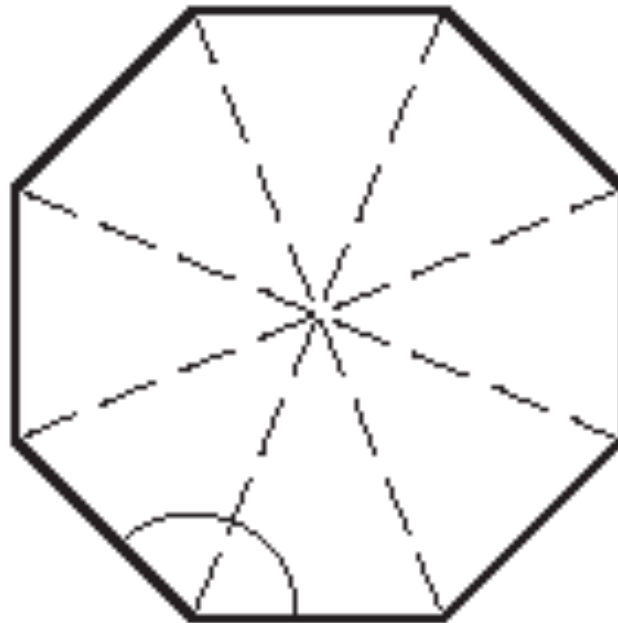


Regular
Heptagon
 129°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

6.

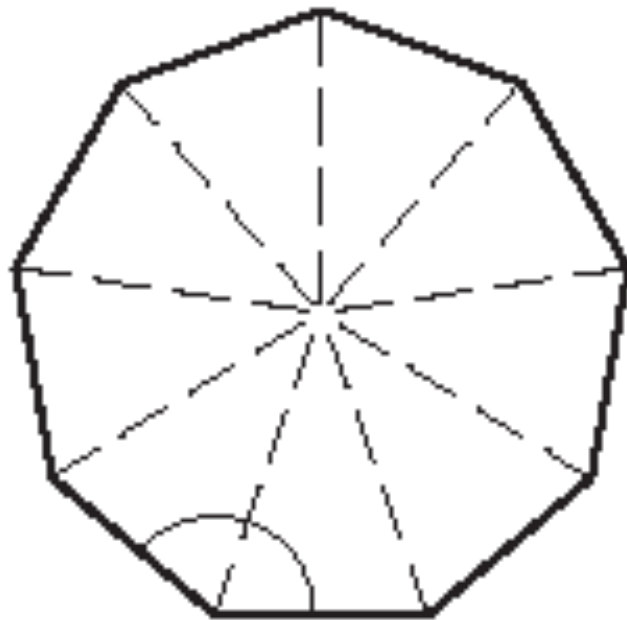


Regular
Octagon
 135°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

7.

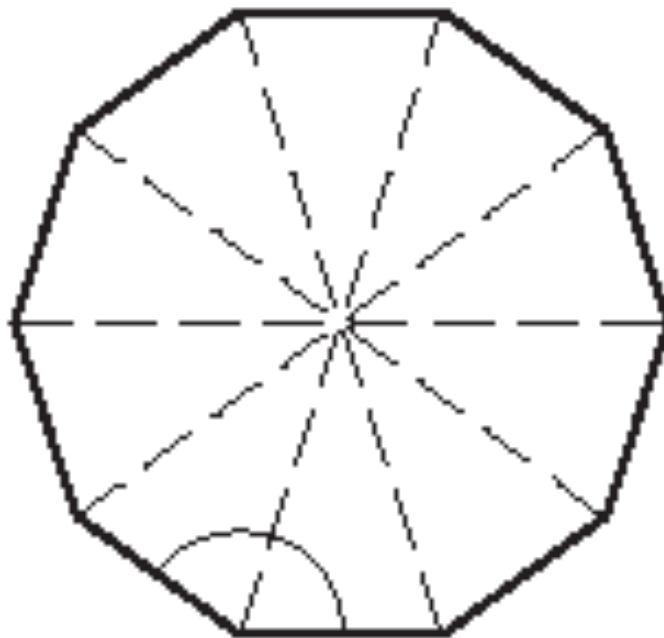


Regular
Nonagon
 140°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

8.

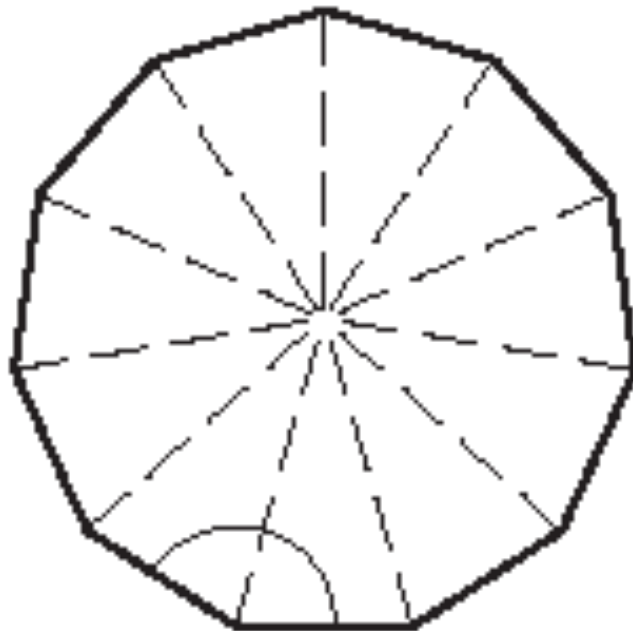


Regular
Decagon
 144°

Angle Exploration

Write the name of each regular polygon. Find the measure of one interior angle of the polygon. Use the dashed lines to help. (*Hint: The sum of the angles that meet at the center of the polygon is 360° . Each triangle formed by dashed lines is isosceles.*)

9.



Regular
Dodecagon
 147°

Angle Exploration

- Summarize our results

Is there a correlation between the number of sides and the degrees?

Sides	Degrees
3	60°
4	90°
5	108°
6	120°
7	129°
8	135°
9	140°
10	144°
11	147°

Angle Exploration

- **What is the sum of the angles in each of the polygons**

Angle Exploration

- Summarize our results

Total Degrees in each polygon.

Do you see a pattern?

Sides	Total	Degrees
3	180°	60°
4	360°	90°
5	540°	108°
6	720°	120°
7	900°	129°
8	1080°	135°
9	1260°	140°
10	1440°	144°
11	1620°	147°

Interior Angles in a Polygon

- **The sum of the angles of the interior angles of a convex n-gon is $(n-2) \cdot 180^\circ$**

Interior Angles in a Polygon

- **What are the angle measures if the polygon is regular**
- **$(n-2) \cdot 180^\circ / n$**

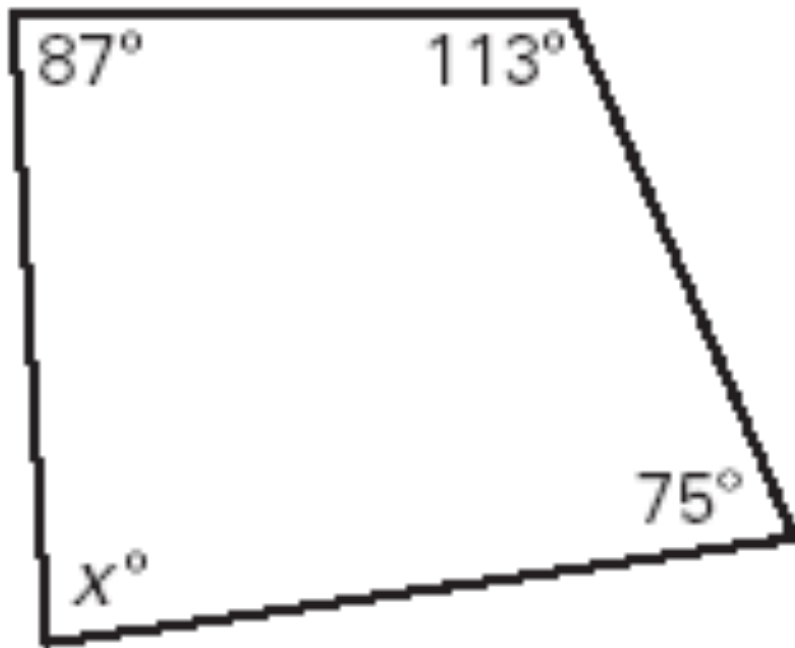
Sample Problems

Find the value of x .



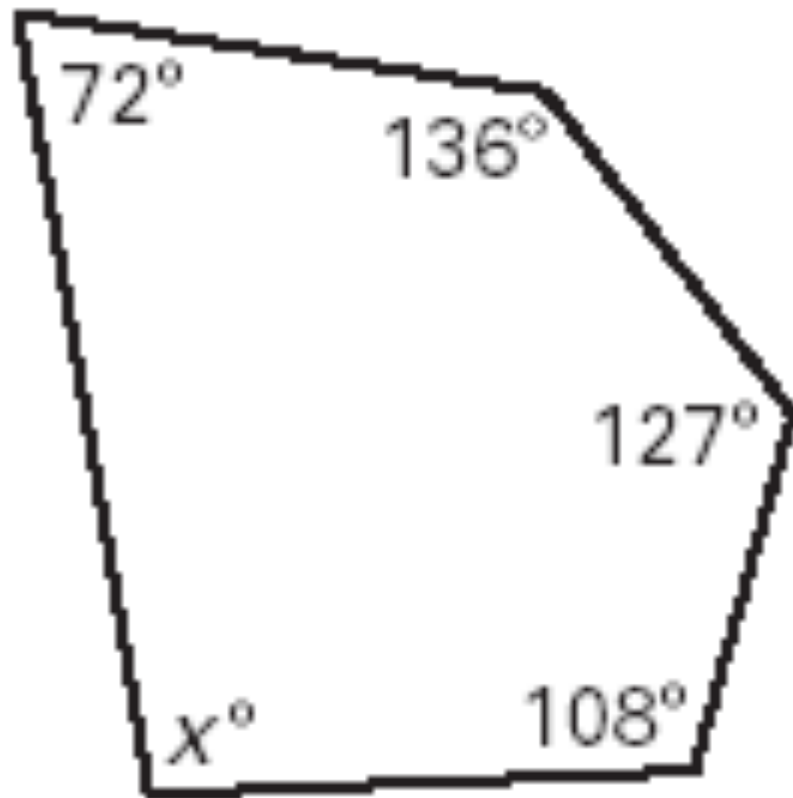
$$x=96$$

Find the value of x .



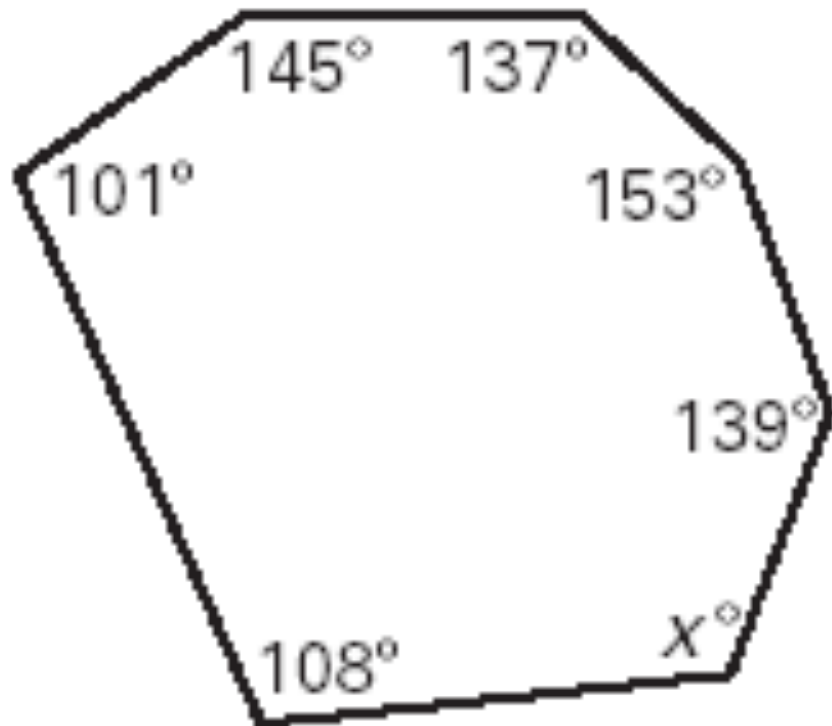
$$x=85$$

Find the value of x .



$$x=97$$

Find the value of x .



$$x=117$$

Exercise 12

