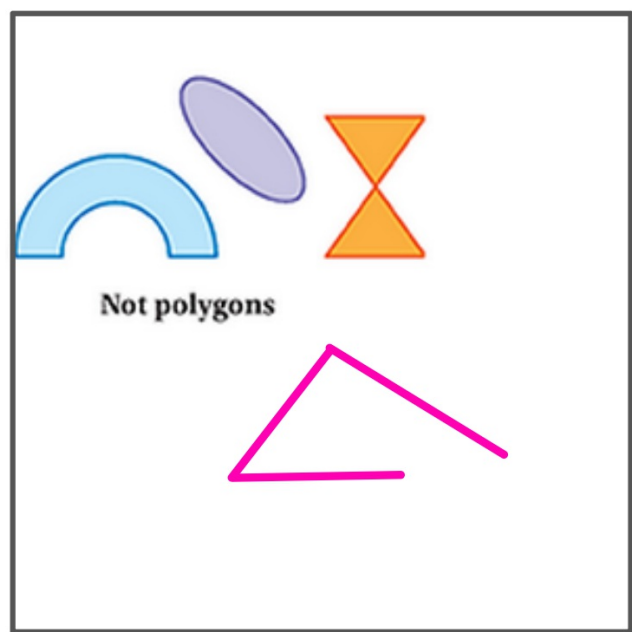
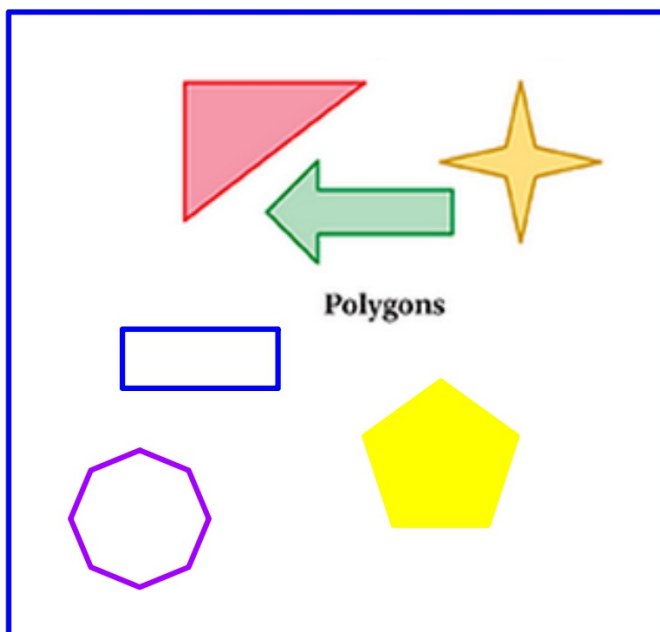


## Lesson 3.3

---

**Learning Target:** Find the sum of the Interior and Exterior angles of a Polygon.

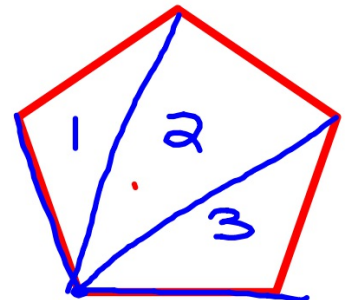
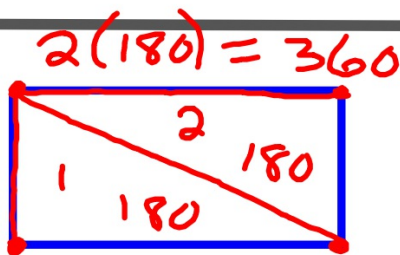
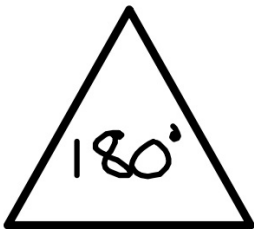
**Polygon:** A closed Figure made up of 3 or more line segments that intersect only at their endpoints.



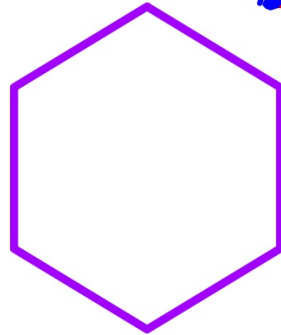
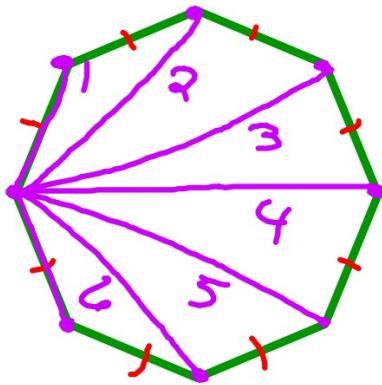
## Key Idea

### Sum of the Interior Angles of a polygon

---



$6(180)$   
 $1080^\circ$



$3(180)$   
 $540^\circ$

## Key Idea

### Sum of the Interior Angles of a polygon

---

$$S = (n - 2) \cdot 180$$

**S** ↑ Sum of Interior Angles

**(n - 2)** ↑ Number of sides

*# of Δ's*

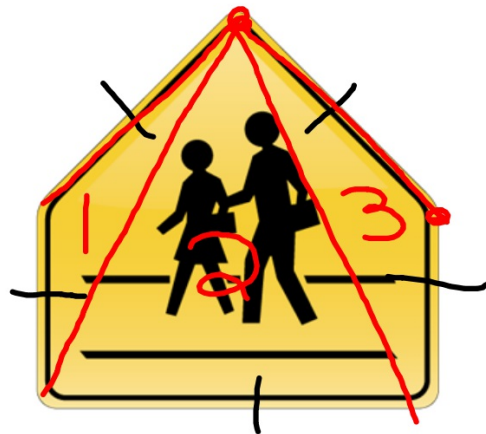
## Example #1

# Finding the Sum of Interior Angle Measures

---

Find the sum of the interior angle measures of the school crossing sign.

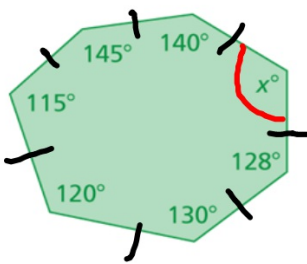
$$\begin{aligned} \text{Sum} &= (5-2) 180 \\ &= 3 \cdot 180 \\ &= 540^\circ \end{aligned}$$



## Example #2

### Finding an Interior Angle Measure

---



Find the value of  $x$ .

Step 1:

$$\begin{aligned} \text{Sum} &= (7-2)(180) \\ &= 5 \cdot 180 \\ &= 900^\circ \end{aligned}$$

Step 2:

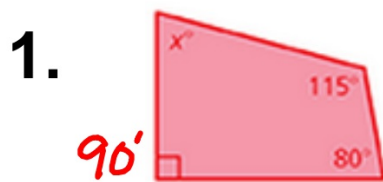
$$x + 140 + 145 + 115 + 120 + 130 + 128 = 900$$

$$x + 778 = 900$$

$$\begin{array}{r} x + 778 = 900 \\ - 778 \quad - 778 \\ \hline \end{array}$$

$$x = 122^\circ$$

**On Your Own.** Find the value of the missing angles.



step 1:

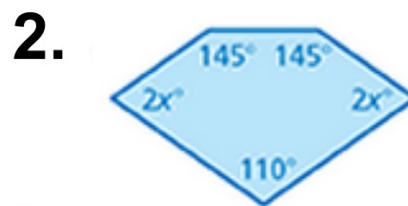
$$\text{sum of angles} = 360$$

step 2:

$$90 + 80 + 115 + x = 360$$

$$285 + x = 360$$

$$x = 75$$



step 1:

$$S = (5 - 2) * 180 = 540$$

step 2:

$$2x + 145 + 145 + 2x + 110 = 540$$

$$4x + 400 = 540$$

$$4x = 140$$

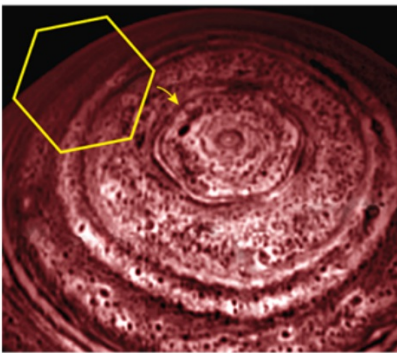
$$x = 35$$

missing angles = 70 and 70

### Example 3

#### Real-Life Application

\* A **Regular Polygon** has congruent sides and interior angles



A cloud system discovered on Saturn is in the approximate shape of a regular hexagon. Find the measure of each interior angle of the hexagon.

**Step 1:** A hexagon has 6 sides. Find the sum of the interior angle measures.

$$S = (n - 2) \cdot 180^\circ$$

Write the formula.

$$= (6 - 2) \cdot 180^\circ$$

Substitute 6 for  $n$ .

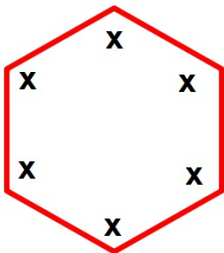
$$= 720^\circ$$

Simplify. The sum of the interior angle measures is  $720^\circ$ .

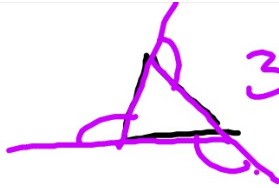
**Step 2:** Divide the sum by the number of interior angles, 6.

$$720^\circ \div 6 = 120^\circ$$

❖ The measure of each interior angle is  $120^\circ$ .







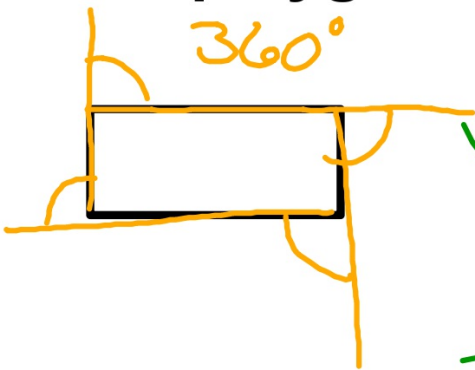
$360^\circ$

## Key Idea #2

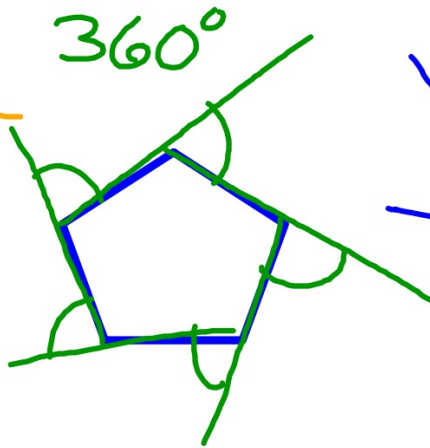
# Sum of the Exterior Angles of a polygon

---

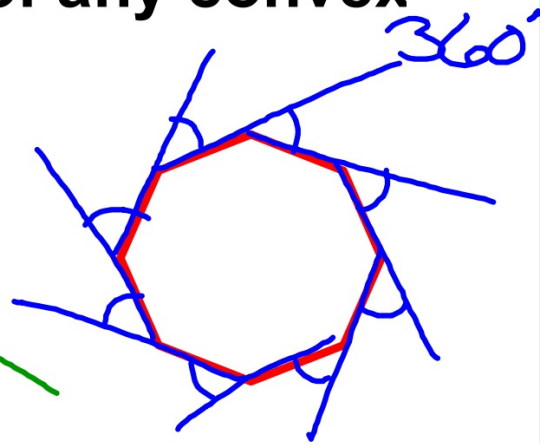
The sum of the measures of the Exterior Angles of any convex polygon is 360.



$360^\circ$



$360^\circ$

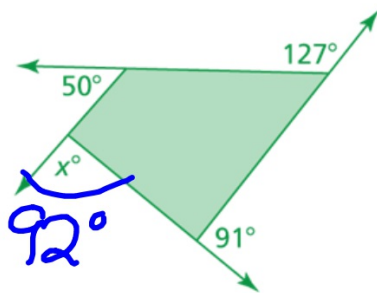


$360^\circ$

## Example 4: Find the measures of Exterior Angles

Find the measures of the exterior angles of each polygon.

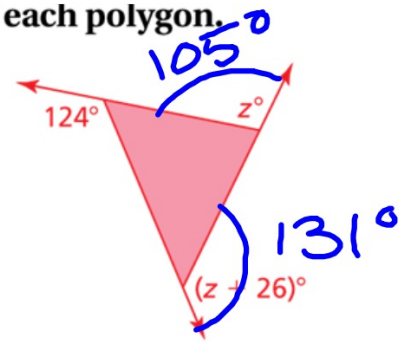
a.



Write and solve an equation

$$\begin{aligned}x + 50 + 91 + 127 &= 360 \\x + 268 &= 360 \\- 268 &- 268 \\ \hline x &= 92^\circ\end{aligned}$$

b.



Write and solve an equation for  $z$ .

$$\begin{aligned}124 + z + z + 26 &= 360 \\2z + 150 &= 360 \\- 150 &- 150 \\ \hline 2z &= 210 \\z &= 105^\circ\end{aligned}$$

# Homework

**Pg 123-125**

**#1-3,**

**10-18 even**

**22-26 all**

**and #31**