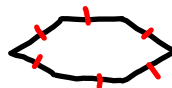


## Geometry: 7.1 Angles of Polygons

Vocab:

Equilateral Polygons:

All sides have the same length.



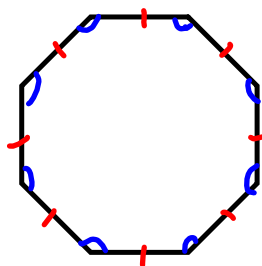
Equiangular Polygons:

All Angles must be the same measure.



Regular Polygons:

Polygons that are Equilateral & Equiangular.



## 7.1 Angles of Polygons

Polygon interior angles theorem:

The sum of all interior angles of a polygon is...

$$\text{sum} = (n-2) \cdot 180^\circ$$

where  $n$  is the number of interior angles.

Ex: The sum of all interior angles of a polygon is 900 degrees.  
How many sides does the polygon have?

$$\frac{900}{180} = \frac{(n-2) \cdot 180}{180}$$

$$\begin{array}{r} 5 = n - 2 \\ +2 \quad +2 \end{array}$$

$$7 = n$$

7 sides

## 7.1 Angles of Polygons

Ex: Find the value of  $x$  in the picture below



Count interior angles: 4

so  $n=4$

$$\begin{aligned} \text{Sum} &= (n-2) \cdot 180^\circ \\ &= (4-2) \cdot 180^\circ \\ &= 2 \cdot 180^\circ \\ &= 360^\circ \end{aligned}$$

So All interior Angles will add to  $360^\circ$ .

$$\begin{aligned} \text{So } 108 + 121 + 59 + x &= 360 \\ 288 + x &= 360 \\ -288 \quad \quad -288 \end{aligned}$$

$$\underline{\underline{x = 72^\circ}}$$

## 7.1 Angles of Polygons

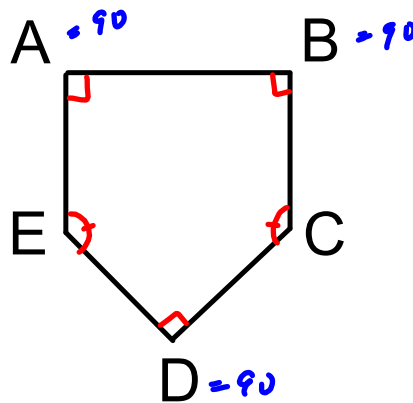
Ex: Below is a diagram of a baseball home plate. Find the measure of angle E and C, then answer the question: Is the polygon regular?

$$\angle E = \angle C$$

let  $x$  be the angle measure

Find what the sum of All Interior Angles must be.  $n = 5$

$$\begin{aligned} \text{sum} &= (n-2) \cdot 180 \\ &= (5-2) \cdot 180 \\ &= 3 \cdot 180 \\ &= 540 \end{aligned}$$



$$\begin{aligned} \angle A + \angle B + \angle C + \angle D + \angle E &= 540^\circ \\ 90^\circ + 90^\circ + x^\circ + 90^\circ + x^\circ &= 540^\circ \end{aligned}$$

$$\begin{aligned} 270 + 2x &= 540 \\ -270 & \quad -270 \end{aligned}$$

$$\frac{2x}{2} = \frac{270}{2}$$

$$x = 135^\circ$$

$$\angle C = 135^\circ$$

$$\angle E = 135^\circ$$

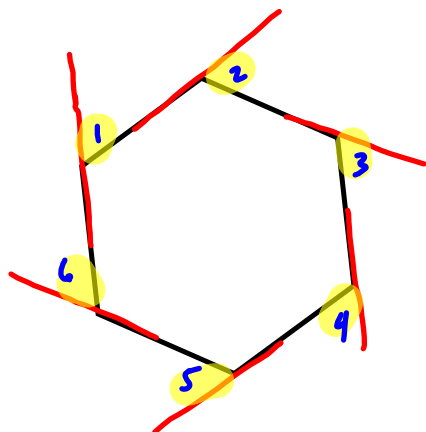
## 7.1 Angles of Polygons

### Polygon Exterior Angles Theorem:

The sum of the measures of all exterior angles of a convex polygon (one angle at each vertex) is...

$$360^\circ$$

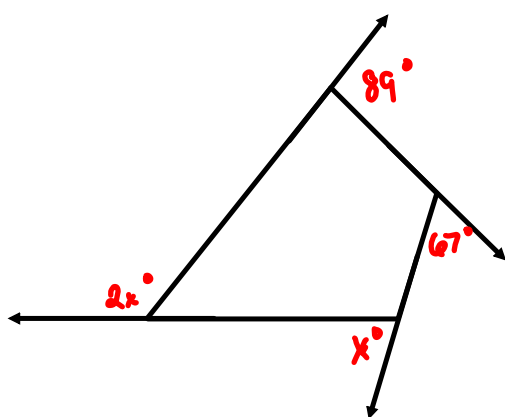
Draw a figure to demonstrate:



so All angles 1 through 6  
add to  $360^\circ$

## 7.1 Angles of Polygons

Ex: Find the value of  $x$  in the diagram below.



All add to Eq. = 360

$$2x + 89 + 67 + x = 360$$

$$3x + 156 = 360$$

$$\begin{array}{r} -156 \\ -156 \end{array}$$

$$\frac{3x}{3} = \frac{204}{3}$$

$$x = 68$$

## 7.1 Angles of Polygons

Homework:

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