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**Do Now**

You are a block away from a skyscraper that is 780 feet tall. Your friend is between the skyscraper and yourself. The angle of elevation from your position to the top of the skyscraper is  $42^\circ$ . The angle of elevation from your friend's position to the top of the skyscraper is  $71^\circ$ . To the nearest foot, how far are you from your friend?

$\tan 42 = \frac{780}{x}$   
 $x = \frac{780}{\tan 42}$   
 $x = 866.2777616$  feet  
 $x = y - a$   
 $x \approx 598$  feet

$\tan 71 = \frac{780}{a}$   
 $a = \frac{780}{\tan 71}$   
 $a = 264.5755384$

Feb 28-1:14 PM

It's very important to know our definitions.

**Convex vs. Concave Polygon**

**CONVEX PENTAGON**

All interior angles are less than  $180^\circ$ .

**CONCAVE PENTAGON**

At least one interior angle is greater than  $180^\circ$ .

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**What is the difference between regular vs. irregular polygons?**

Regular Polygons	Irregular Polygons
	<p>Angles equal but sides not equal</p> <p>Sides equal but angles not equal</p> <p>Neither sides equal nor angles equal</p>

A regular polygon is always convex.

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**Teamwork**

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Jaslich	Drew	Noah
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	Ayden	Ariel
Daniel	Anthony	Arlene
Kylie	Lexi	Andrea
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Lior		

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Main Ideas/Questions		Notes		
<b>Interior Angles Sum</b>		The sum of the degrees in any polygon can be determined by the number of triangles that can be drawn within the polygon. Complete the table below and look for a pattern to find the sum of the degrees in any polygon.		
Polygon	Picture	# of Sides	# of Triangles	Sum of Interior $\angle$ 's
Triangle		3	1	$180^\circ$
Quadrilateral		4	2	$360^\circ$
Pentagon		5	3	$540^\circ$
Hexagon		6	4	$720^\circ$
Heptagon	<b>X</b>	7	5	$900^\circ$
Octagon	<b>X</b>	8	6	$1080^\circ$
Nonagon	<b>X</b>	9	7	$1260^\circ$
Decagon	<b>X</b>	10	8	$1440^\circ$

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$n = \# \text{ of Sides}$

<b>Sum of Interior Angles Formula!</b>	If n represents the number of sides of a polygon, then the sum of the interior angles (S) can be found using the formula: $S = 180(n-2)$
<b>One Interior Angle of A Regular Polygon!</b>	A regular polygon is one in which all sides are equal; therefore all <u>angles</u> are equal! To find the measure of an interior angle in a regular polygon, use: $\text{Each int } \angle = \frac{180(n-2)}{n}$

Equilateral  $\Delta$   $n=3$   
 $S = 180(n-2) = 180(3-2) = 180$   
 $\frac{180}{3}$

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**Interior Angles Practice!**

1) Find the sum of the interior angles of a 15-gon. $S = 180(15-2) = 2,340^\circ$	2) Find the sum of the interior angles of a 21-gon. $S = 180(21-2) = 3,420^\circ$
3) What is the measure of each interior angle of a regular pentagon? $\frac{180(5-2)}{5} = 108^\circ$	4) What is the measure of each interior angle of a regular 18-gon? $\frac{180(18)}{18} = 160^\circ$

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**Exterior Angles Sum**

Exterior angles are always supplementary to their adjacent interior angle. On the polygons below, find the measure of each exterior angle along with the sum of all exterior angles.

<p><b>Triangle:</b></p> <p>Sum of Exterior Angles: <math>360</math></p>	<p><b>Quadrilateral:</b></p> <p>Sum of Exterior Angles: <math>360</math></p>
<p><b>Pentagon:</b></p> <p>Sum of Exterior Angles: <math>360</math></p>	<p><b>Hexagon:</b></p> <p>Sum of Exterior Angles: <math>360</math></p>

Conclusion:  $\text{Sum of ext \&'s} = 360$

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**Exterior Angles Practice!**

5) What is the measure of each exterior angle of a regular hexagon? $\frac{360}{6} \rightarrow 60^\circ$	6) What is the measure of each exterior angle of a regular 24-gon? $\frac{360}{24} = 15^\circ$
7) If the exterior angle of a regular polygon measures $12^\circ$ , how many sides does the polygon have? $\frac{12^\circ}{1} = \frac{360}{n}$ $12n = 360$ $n = 30$	8) If the exterior angle of a regular polygon measures $40^\circ$ , how many sides does the polygon have? $\frac{40}{1} = \frac{360}{n}$ $40n = 360$ $n = 9$

SUM of the Interior Angles $S = 180(n-2)$	SUM of the Exterior Angles $S = 360^\circ$
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**Formulas to Memorize!!!!**

Measure of ONE Interior Angle (of a regular polygon) $= \frac{180(n-2)}{n}$	Measure of ONE Exterior Angle (of a regular polygon) $= \frac{360}{n}$
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What is the measure of one angle of a NON-REGULAR pentagon?

Cannot be determined. Would have to be measured using a measuring device or would have to be given the other four angles.

Mar 2-8:06 AM

**HW: GCC 9.1 hw section**  
  
**Exam Next Thursday 3/12**

Mar 2-8:29 AM

HOMEWORK

Geometry CC - Unit 9  
Lesson 1: Angles of Polygons (Day 1)  
MI LB

1. What is the sum of the measures of the interior angles of an octagon? \_\_\_\_\_
2. What is the sum of the measures of the interior angles of a 21-gon? \_\_\_\_\_
3. What is the measure of each interior angle of a regular hexagon? \_\_\_\_\_
4. What is the measure of each interior angle of a regular 16-gon? \_\_\_\_\_
5. What is the sum of the measures of the exterior angles of a decagon? \_\_\_\_\_
6. What is the measure of each exterior angle of a regular 30-gon? \_\_\_\_\_
7. If the exterior angle of a regular polygon is  $22.5^\circ$ , how many sides does it have? \_\_\_\_\_
8. If the interior angle of a regular polygon measures  $170^\circ$ , how many sides does it have? \_\_\_\_\_
9. If the sum of the measures of the interior angles of a polygon is  $1080^\circ$ , how many sides does it have? \_\_\_\_\_
10. If the sum of the measures of the interior angles of a polygon is  $5400^\circ$ , how many sides does it have? \_\_\_\_\_