Unit 3 – Geometry

Chapter 7 – Geometric Relationships
Chapter 8 – Measurement Relationships
Chapter 9 – Optimizing Measurements

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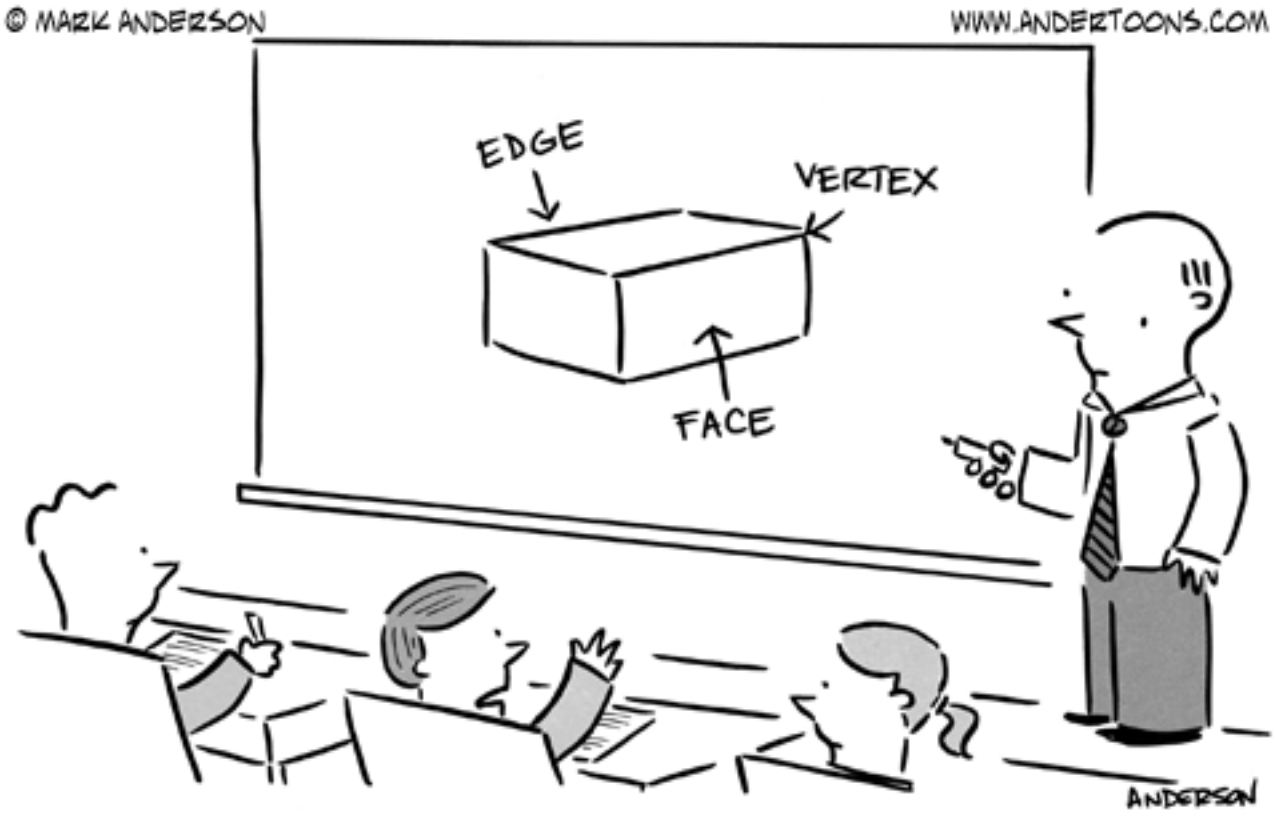

"That's fine, but you haven't told us the most important part - what's *in* it?!"

Chapter 7 Outline

Section	Subject	Homework Notes	Lesson and Homework Complete (initial)
7.0	Geometry Intro		
7.1	Angle Relationships in Triangles		
7.2	Angle Relationships in Rectangles		
7.3	Angle Relationships in Polygons		

Unit Performance

Homework Completion: None Some Most All

Days absent:_____

Test Review Complete? None Some All

Assignment Mark (%):_____

Test Mark (%):_____

Notes to yourself to help with exam preparation:

Chapter 8 Outline

Section	Subject	Homework Notes	Lesson and Homework Complete (initial)
8.1	Pythagorean Theorem		
8.2	Perimeter and Area of Composite Figures		
8.3a	Volume of Prisms and Pyramids		
8.3b	Surface Area of Prisms and Pyramids		
8.4/8.5	Volume and Surface Area of Cones		
8.6/8.7	Volume and Surface Area of Spheres		

Unit Performance

Homework Completion: None Some Most All

Days absent:_____

Test Review Complete? None Some All

Assignment Mark (%):_____

Test Mark (%):_____

Notes to yourself to help with exam preparation:

Chapter 9 Outline

Section	Subject	Homework Notes	Lesson and Homework Complete (initial)
9.1	Perimeter and Area Relationships of a Rectangle		
9.2	Minimize the Surface Area of a Square Based Prism		
9.3	Maximize the Volume of a Square Based Prism		
9.4	Maximize the Volume of a Cylinder		
	Culminating Assignment		

Unit Performance

Homework Completion: None Some Most All

Days absent:_____

Test Review Complete? None Some All

Assignment Mark (%):_____

Test Mark (%):_____

Notes to yourself to help with exam preparation:

Section 7.0 – Geometry Intro

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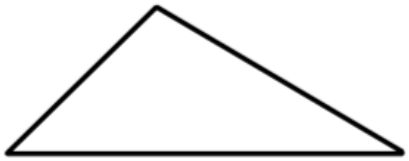
Part 1: Classifying Triangles

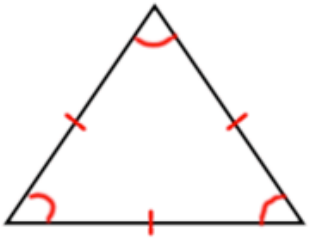
Classify Using Side Lengths:

Scalene Triangle
- no equal sides or angles



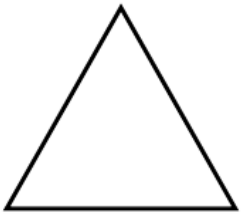
Isosceles Triangle
- 2 equal sides
- 2 equal angles

Equilateral Triangle
- 3 equal sides
- 3 equal angles

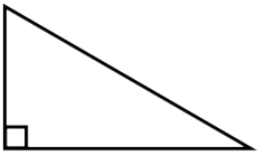


Classify Using Angle Measures:

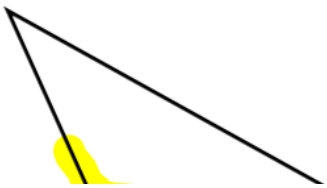
Acute Triangle
- 3 acute angles
(less than 90 degrees)



Right Triangle
- one right angle
(90 degrees)

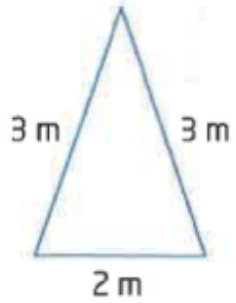


Obtuse Triangle
- one obtuse angle
(between 90 and 180 degrees)

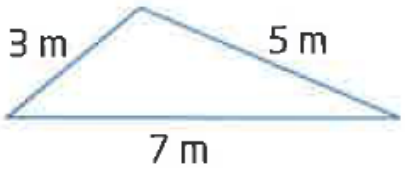


Example 1: Classify Each Triangle Using its Side Lengths

a)

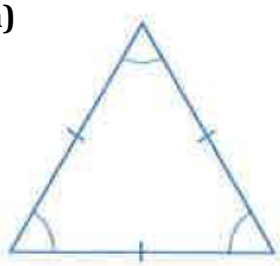


b)



Example 2: Classify Each Triangle in Two ways using its angle measures

a)



b)

<u>Part 2: Classifying Polygons</u>

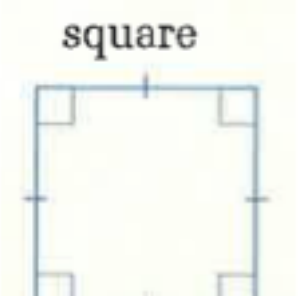
A ***polygon*** is a closed figure formed by three or more line segments.

A ***regular polygon*** has all sides equal and all angles equal.

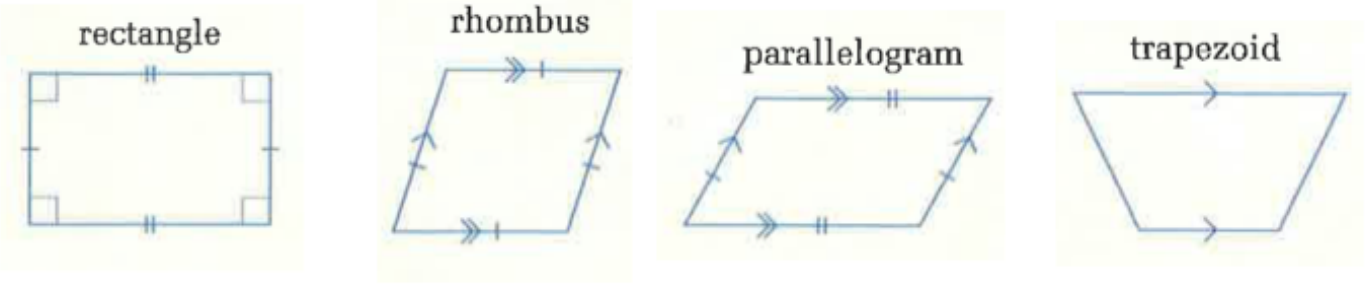
Number of Sides	Name
3	triangle
4	quadrilateral
5	pentagon
6	hexagon

Some **quadrilaterals** have special names.

A regular quadrilateral is a square.

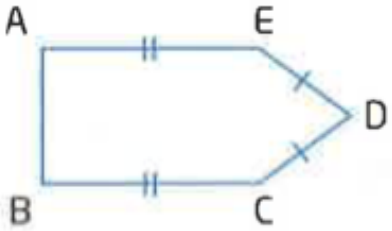


An irregular quadrilateral may be a ***rectangle***, ***rhombus***, ***parallelogram***, or ***trapezoid***



Example 3: Classify each polygon according to its number of sides and whether it is regular or irregular.

a)



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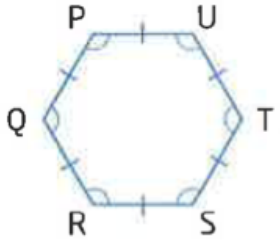
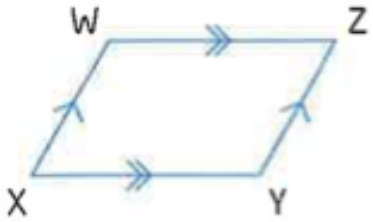


Example 4: Classify each quadrilateral

a)



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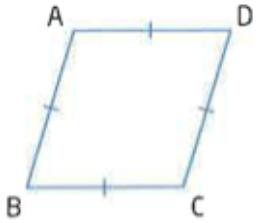
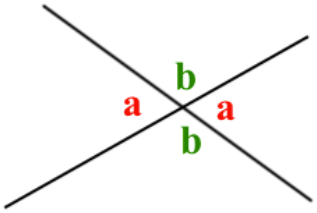


Part 3: Angle Properties

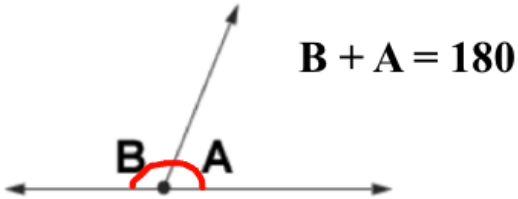
Opposite Angles:

- When 2 angles intersect, the opposite angles are equal.



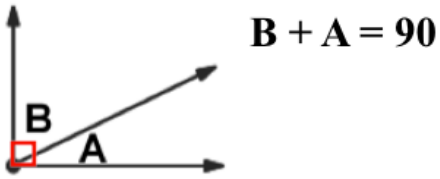
Supplementary Angles:

- angles that add to 180 degrees
- angles on a straight line are supplementary



Complementary Angles:

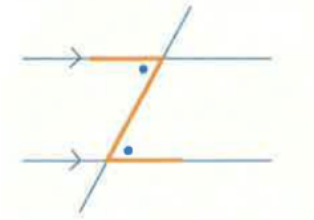
- angles that add to 90 degrees



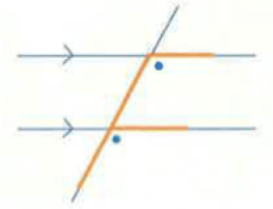
Part 4: Parallel Line Theorems

When a transversal crosses parallel lines, many pairs of angles are related…

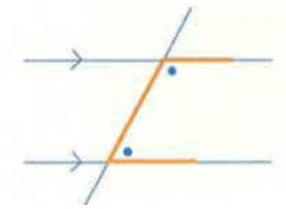
Alternate Interior Angles are equal
- Z pattern



Corresponding Angles are equal
- F pattern

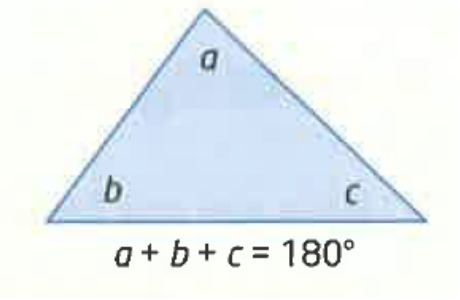


Co-Interior Angles add to 180
- C pattern

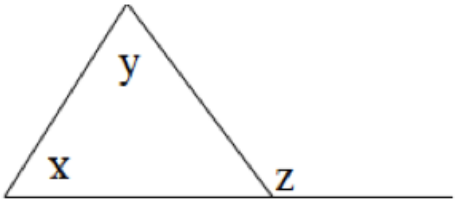


Part 6: Triangle Theorems

The sum of the **interior angles** of a triangle is **180** degrees.

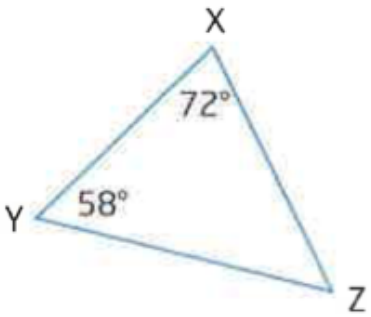


The **exterior angle** is equal to the sum of the 2 opposite interior angles.



Example 5: Find the measure of the third angle in each triangle…

a)



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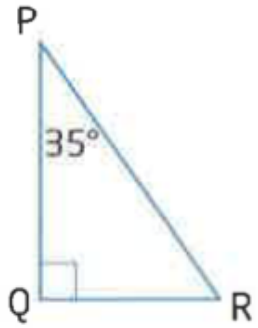
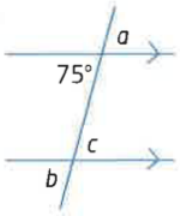


Example 6: Find the measure of the angles a, b, and c. Give reasons for your answers…

a)



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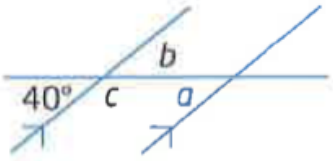

Section 7.1 – Angle Relationships in Triangles

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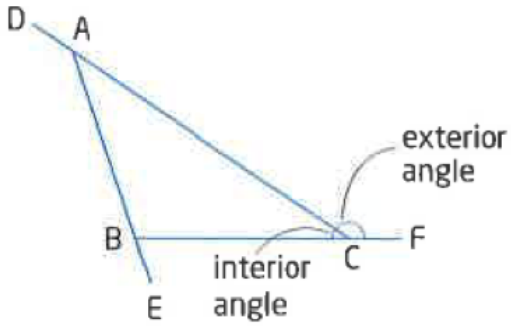
Interior and Exterior Angles

Interior Angle - angle formed on the inside of a polygon by two sides meeting at a vertex.

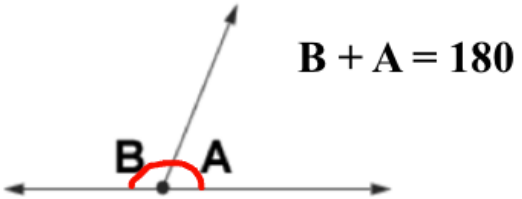
Exterior Angle - angle formed on the outside of a geometric shape by extending one of the sides past a vertex.



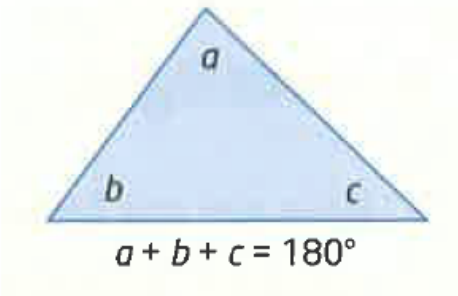
You Must Remember…

Supplementary Angles:

- angles that add to 180 degrees
- angles on a straight line are supplementary

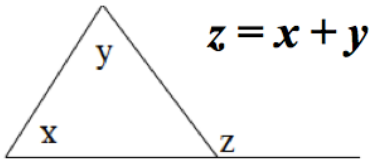


The sum of the **interior angles** of a triangle is **180** degrees.

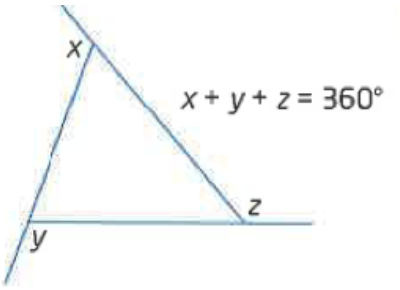


New Exterior Angle Rules…

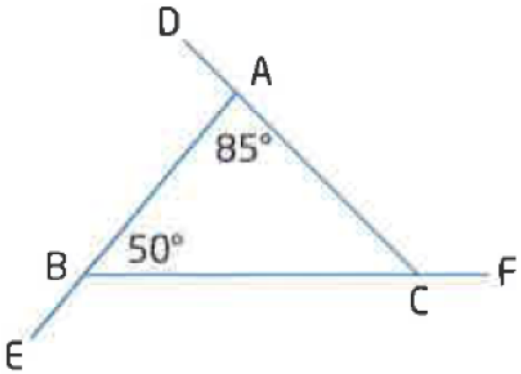
The **exterior angle** is equal to the sum of the 2 opposite interior angles.



The sum of the **exterior angles** of a triangle is 360 degrees.



Example 1: Find the measures of the exterior angles in ΔABC



Note: at vertex A and B, the interior and exterior angles are supplementary angles (form an angle of 180 degrees)

∠DAB:

∠EBC:

∠ACF:

Method 1: Since the exterior angle at a vertex of a triangle is equal to the sum of the interior angles at the other two vertices...

Method 2: Since the sum of the exterior angles of a triangle is 360 degrees...

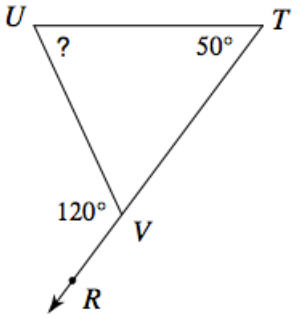
The measures of the three exterior angles are:

∠DAB =

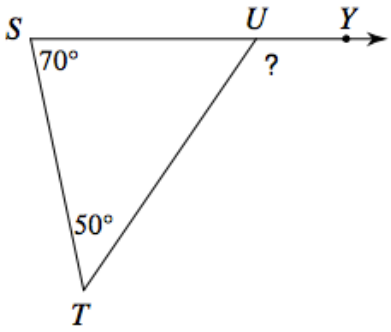
∠EBC =

∠ACF =

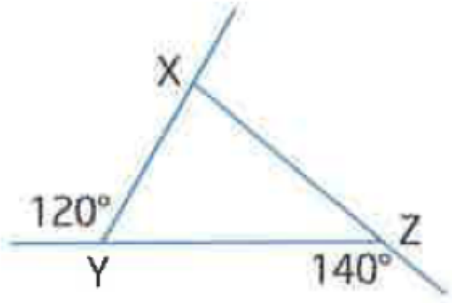
Example 2: Find the measure of the indicated angle



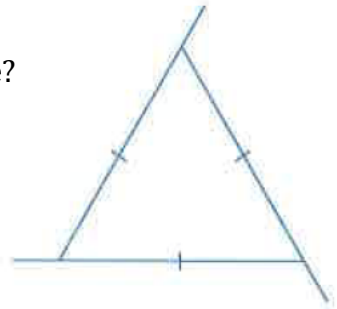
Example 3: Find the measure of the indicated angle



Example 4: Find the measure of the exterior angle at vertex *X*



Example 5: What is the measure of each exterior angle of an equilateral triangle?



All angles in an equilateral triangle are _____.

Therefore all three interior angles are...

At each vertex, the interior angle and exterior angle are supplementary, meaning they sum to _____.

Therefore all three exterior angles are...

Section 7.2 – Angle Relationships in Quadrilaterals

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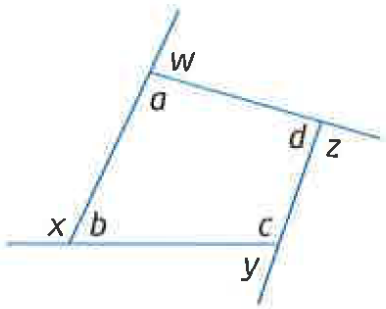
Angle Relationships in Quadrilaterals

The sum of the **interior** angles of a quadrilateral is 360 degrees.

The sum of the **exterior** angles of a quadrilateral is also 360 degrees.



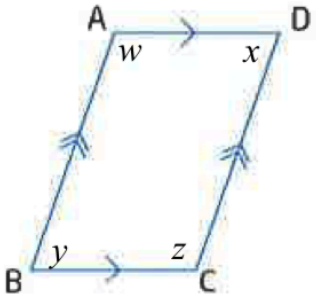
Interior angles:
$a + b + c + d = 360°$

Exterior angles:
$w + x + y + z = 360°$

Angle Relationships in Parallelograms

Adjacent angles in a parallelogram are supplementary (add to 180).

Opposite angles in a parallelogram are equal.



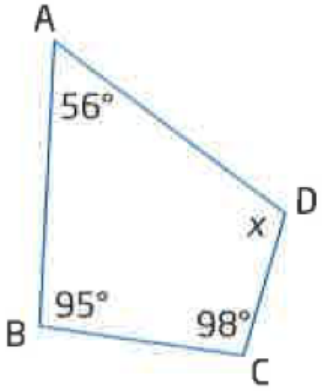
Adjacent angles:

$w + x = 180$
$w + y = 180$
$y + z = 180$
$z + x = 180$

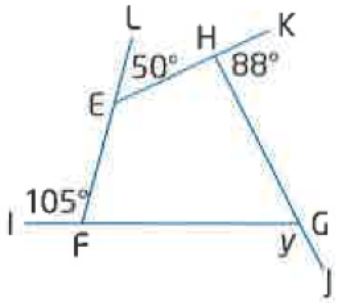
Opposite angles:

$w = z$
$x = y$

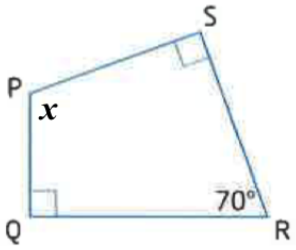
Example 1: Find the measure of the unknown angle



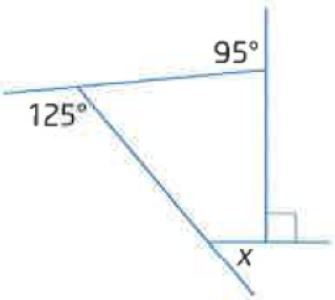
Example 2: Find the measure of the unknown angle



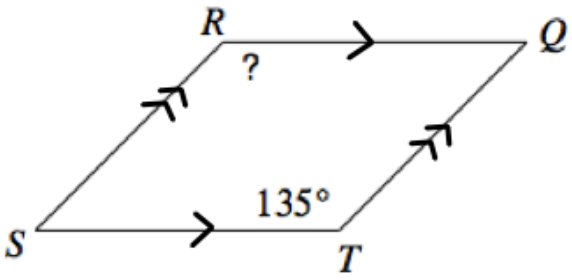
Example 3: Find the measure of the unknown angle



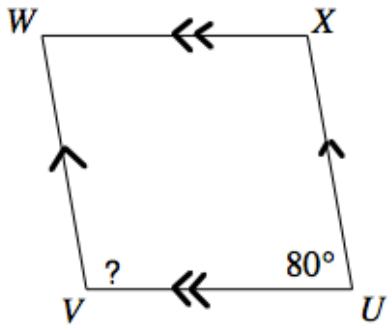
Example 4: Find the measure of the unknown angle



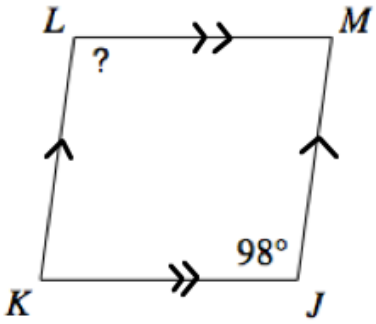
Example 5: Find the measure of the unknown angle



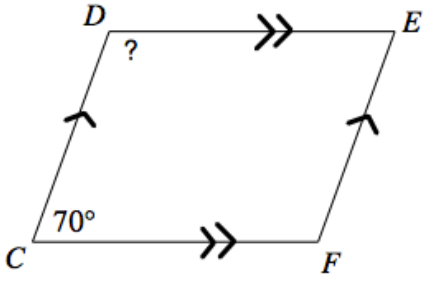
Example 6: Find the measure of the unknown angle



Example 7: Find the measure of the unknown angle



Example 8: Find the measure of the unknown angle



Section 7.3 – Angle Relationships in Polygons

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Types of Polygons

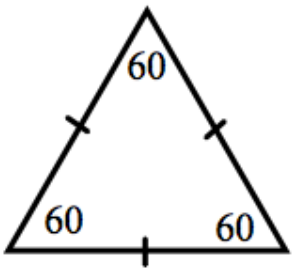
Convex Polygon: All interior angles measure less than 180 degrees.

- no part of any line segment joining two points on the polygon goes outside the polygon.

Concave Polygon: Can have interior angles greater than 180 degrees.

- parts of some line segments joining two points on the polygon go outside the polygon.

Regular Polygon: All sides are equal and all interior angles are equal.



Angle Properties in Polygons

The sum of the exterior angles of a convex polygon is 360 degrees.

For a polygon with n sides, the sum of the interior angles, in degrees, is $180(n - 2)$

For a regular polygon with n sides, the measure of each interior angle is equal to: $\frac{180(n-2)}{n}$

For a regular polygon with n sides, the measure of each exterior angle is equal to: $\frac{360}{n}$

Example 1: Calculate the sum of the interior angles of an octagon

$$\boxed{180(n-2)}$$

Example 2: Calculate the measure of each of the interior angles of a *regular* octagon.

$$\boxed{\frac{180(n-2)}{n}}$$

Example 3: Calculate the measure of each of the exterior angles of a *regular* octagon.

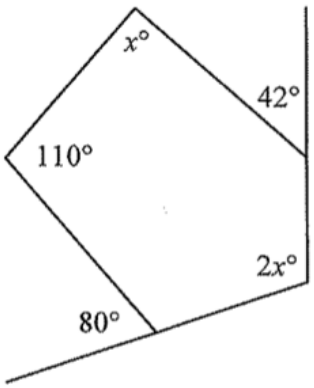
$$\boxed{\frac{360}{n}}$$

Example 4: How many sides does a polygon have if each of its interior angles measure 140 degrees?

Example 5: The measure of one of the exterior angles of a regular polygon is 30 degrees. How many sides does it have?

Example 6: Five angles of a hexagon have measures 100°, 110°, 120°, 130°, and 140°. What is the measure of the sixth angle?

Example 7: Solve for x.



Complete the following chart and then complete the worksheet

Polygon	Number of Sides	Sum of Interior Angles	Sum of Exterior Angles
Triangle			
Quadrilateral			
Pentagon			
Hexagon			
Heptagon			
Octagon			
Enneagon			
Decagon			