

Geometry Unit 4

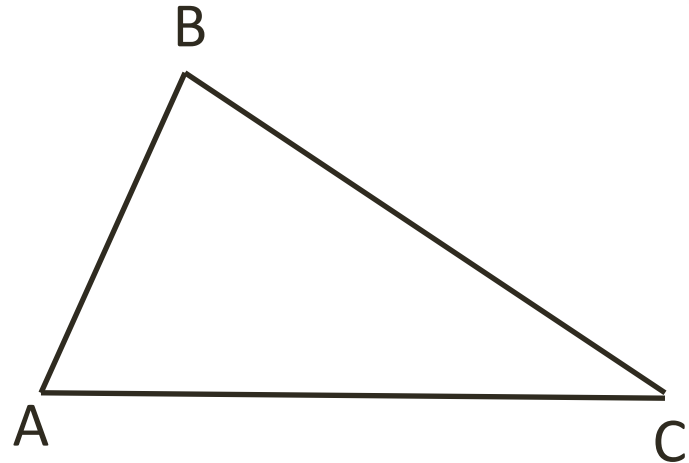
Angles of a Triangle

Angles of A Triangle

- **Content Objective**: Students will be able to identify the properties and classifications of specific triangles, using them to solve problems.
- **Language Objective**: Students will be able to write and solve equations using the sum of the angles of a triangle.

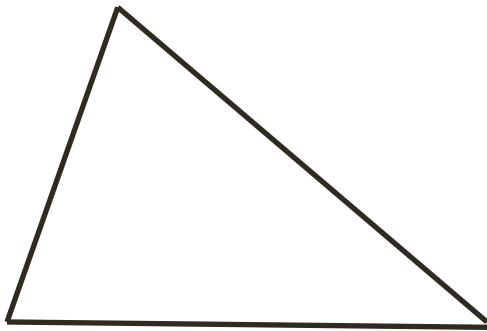
Triangle Properties

- Each of the three points of a triangles is known as a **vertex**
- From $\triangle ABC$, we can see that
- Vertices: points A, B, and C.
- Sides: \overline{AB} , \overline{BC} , \overline{CA}
- Angles: $\angle A$, $\angle B$, $\angle C$



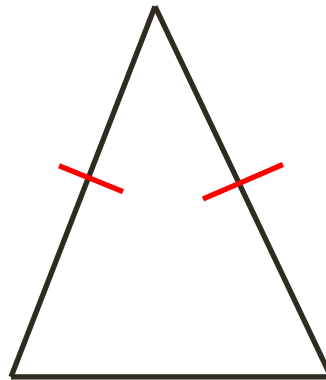
Types of Triangles

- A triangle is sometimes classified by the number of congruent sides its has



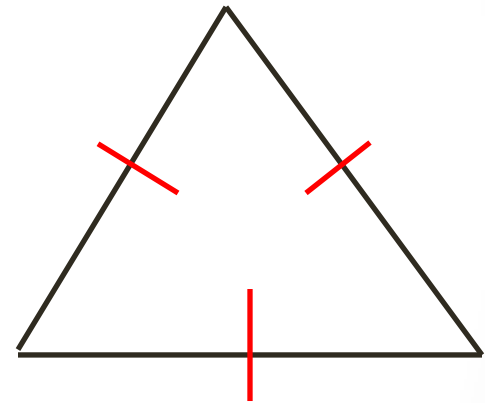
No Sides Congruent

Scalene Triangle



Two Sides Congruent

Isosceles Triangle

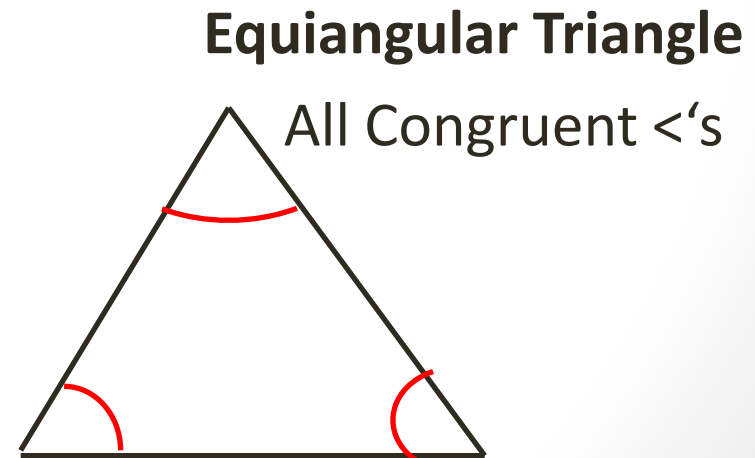
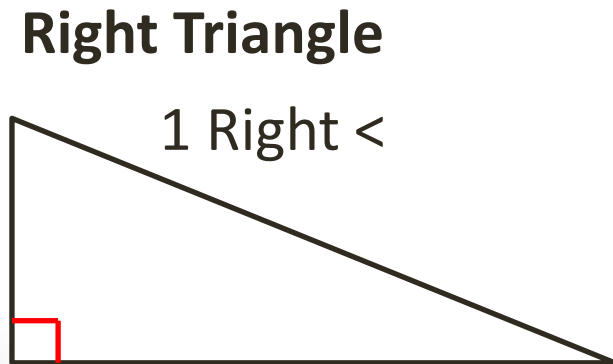
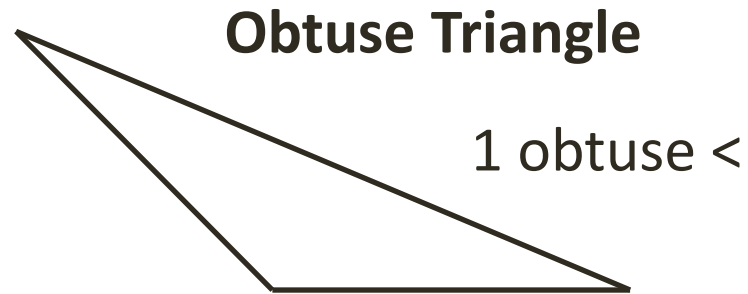
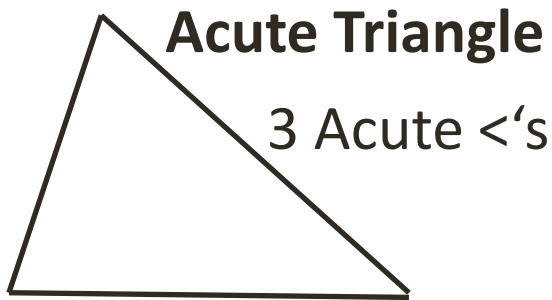


All Sides Congruent

Equilateral Triangle

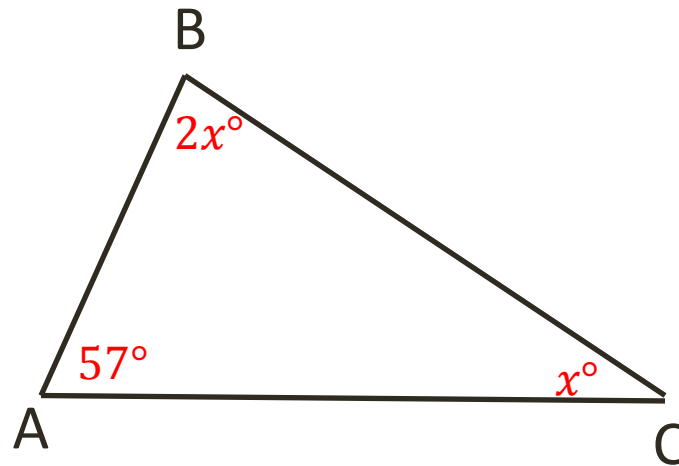
Types of Triangles

- A triangle is sometimes classified the angles present in them



The Sum of the Angles

- **Theorem 3-11**: The sum of the measures of the angles of a triangle is 180.
- From the given triangle ABC,
- $m\angle A + m\angle B + m\angle C = 180$
- Example: In $\triangle ABC$, $m\angle A = 57^\circ$, $m\angle B = 2x$, and $m\angle C = x$. Find $m\angle C$.
- We apply theorem 3-11:
 - $57 + x + 2x = 180$
 - $57 + 3x = 180$
 - $3x = 123$
 - $x = 41$



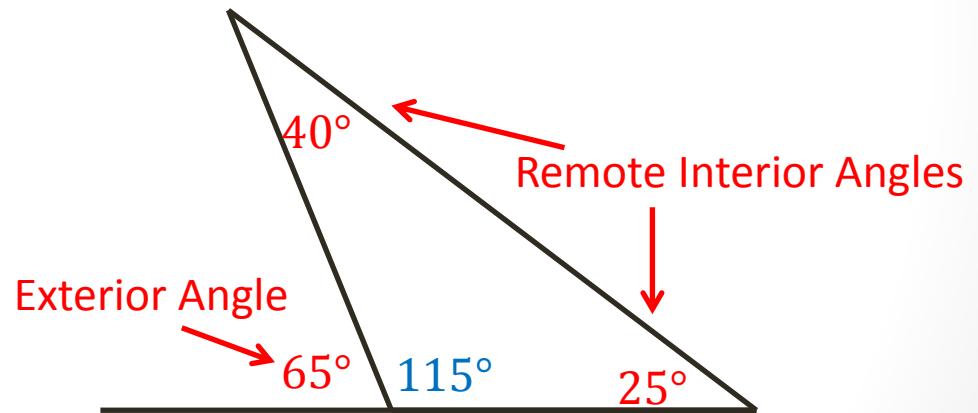
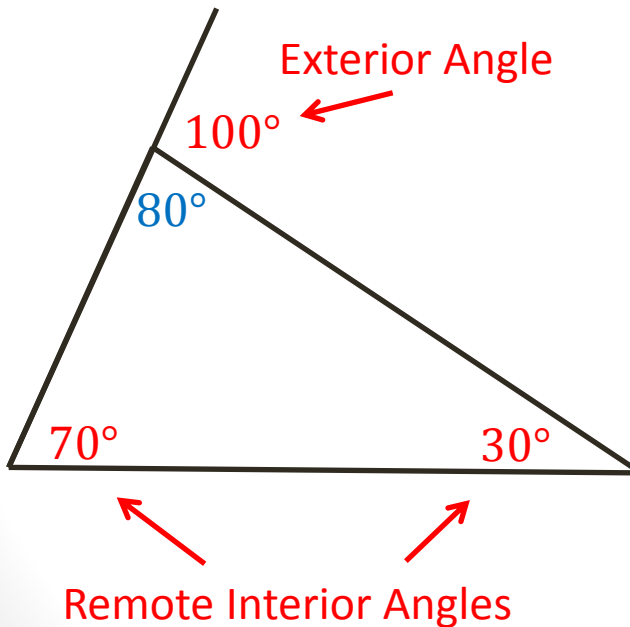
Thus, $m\angle C = 41^\circ$

Corollaries

- A statement that can be proved easily by applying a theorem is often called a **corollary** of the theorem.
- These 4 statements are corollaries of theorem 3-11.
- **Corollary 1**: If two angles of a triangle are congruent to two angles of another triangle, then the third angles are congruent.
- **Corollary 2**: Each angle of an equiangular triangle has a measure of 60.
- **Corollary 3**: In a triangle, there can be at most one right angle or obtuse angle.
- **Corollary 4**: The acute angles of a right triangle are complementary.

Exterior Angles

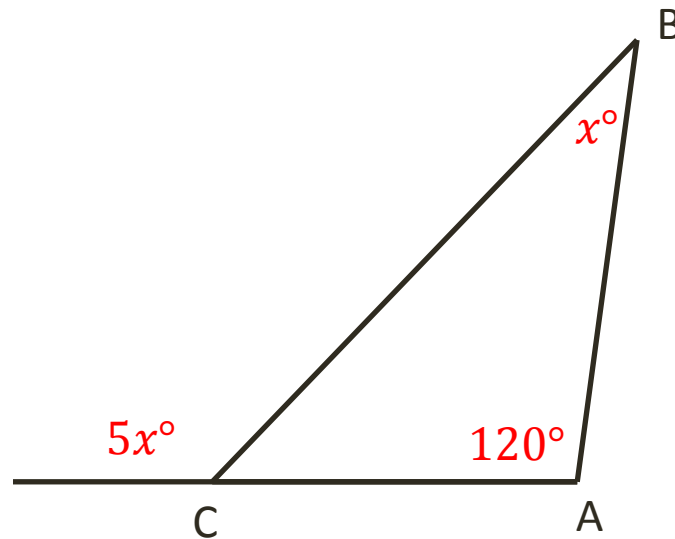
- When one side of a triangle is extended, an **Exterior Angle** is formed.
- Each Exterior Angle of a triangle is supplementary to the interior angle of the triangle that it is adjacent to.



Exterior Angles Continued

- **Theorem 3-12**: The measure of an exterior angle of a triangle equals the sum of the measures of the two remote interior angles.
- **Example**: In $\triangle ABC$, $m\angle A = 120$, and an exterior angle at C is five times as large as $\angle B$. Find $m\angle B$.
- We can apply theorem 3-2:
 - $5x = 120 + x$
 - $4x = 120$
 - $x = 30$

Thus, $m\angle B = 30$



Exit Ticket

Complete Each Statement with the word *always*, *sometimes*, or *never*.

1. If a triangle is isosceles, then it is _____ equilateral.
2. If a triangle is equilateral, then it is _____ isosceles.
3. If a triangle is scalene, then it is _____ isosceles.
4. If a triangle is obtuse, then it is _____ isosceles.