

Section Overview

Properties and Angle Relationships in Triangles

Lessons 4-1, 4-2

Why? A knowledge of the types of triangles and their properties will be needed throughout geometry and will be helpful in real-world situations.

Triangle Classification

By Angle Measures

Acute Triangle



Three acute angles

Equiangular Triangle



Three congruent acute angles

Right Triangle



One right angle

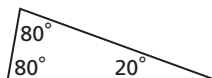
Obtuse Triangle



One obtuse angle

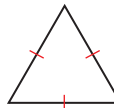
Example

Acute isosceles



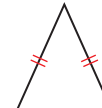
By Side Lengths

Equilateral Triangle



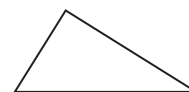
Three congruent sides

Isosceles Triangle



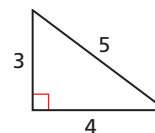
At least two congruent sides

Scalene Triangle

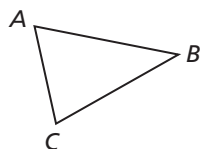


No congruent sides

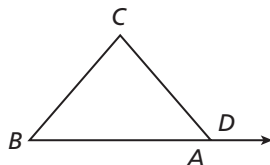
Right scalene



Theorem

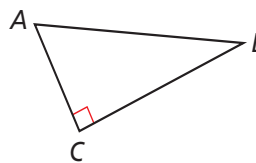


For any $\triangle ABC$,
 $m\angle A + m\angle B + m\angle C = 180^\circ$.

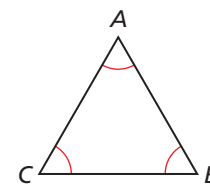


For any $\triangle ABC$ and exterior $\angle D$ adjacent to $\angle A$,
 $m\angle D = m\angle B + m\angle C$.

Corollaries



For any right $\triangle ABC$ with right $\angle C$,
 $m\angle A + m\angle B = 90^\circ$.



For any equiangular $\triangle ABC$, $m\angle A = m\angle B = m\angle C = 60^\circ$.

Congruent Triangles

Lesson 4-3

Why? Properties of congruent triangles are used in mathematical proofs.

$$\begin{aligned} \angle A &\cong \angle D, \overline{AB} \cong \overline{DE} \\ \angle B &\cong \angle E, \overline{BC} \cong \overline{EF} \\ \angle C &\cong \angle F, \overline{AC} \cong \overline{DF} \end{aligned}$$

$$\triangle ABC \cong \triangle DEF$$

