Lesson 5.1: Angles of Triangles

Wednesday, January 11, 2023 10:45 PM

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5.1 Angles
Of Triangles

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Workbook pages 274-275

Florida's B.E.S.T. Standards for Mathematics

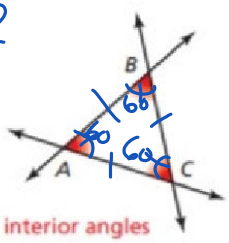
MA.912.GR.1.3 Prove relationships and theorems about triangles. Solve mathematical and real-world problems involving postulates, relationships and theorems of triangles.

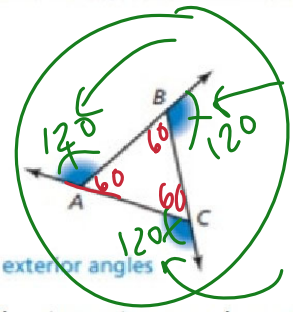
Content Objective
Students will prove and apply the Triangle Angle-Sum Theorem, Exterior Angle Theorem, and Triangle Angle-Sum Theorem Corollaries.

Finding Angle Measures of Triangles

When the sides of a polygon are extended, other angles are formed. The original angles are the **interior angles**. The angles that form linear pairs with the interior angles are the **exterior angles**.

Equilateral all sides & angles ≅ $\frac{180}{3} = 60°$





EXTERIOR $\frac{360}{3}$ $120°$

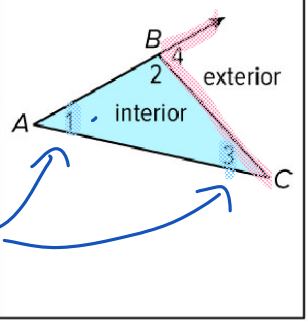
*To find the degrees of the interior angles of a regular polygon Divide 180 by the amount of angles.

*To find the degrees of the exterior angles of a regular polygon Divide 360 by the amount of angles.

Learn

Exterior Angles of Triangles

outside **exterior angles**	An **exterior angle of a triangle** is an angle formed by one side of the triangle and the extension of an adjacent side. A triangle has three exterior angles. ∠4 is an exterior angle of △*ABC*.
far away **remote interior angles** inside	Each exterior angle of a triangle has two **remote interior angles** that are not adjacent to the exterior angle. ∠1 and ∠3 are the remote interior angles for ∠4.

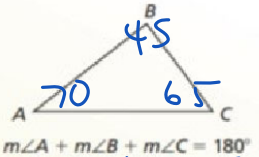


Theorem

Theorem 5.1 Triangle Sum Theorem

The sum of the measures of the interior angles of a triangle is 180°.

Proof p. 234; Ex. 53, p. 238



$m\angle A + m\angle B + m\angle C = 180°$

$70 + 45 + 65 = 180$

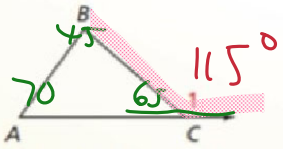
Theorem

Theorem

Theorem 5.2 Exterior Angle Theorem

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.

Proof Ex. 42, p. 237



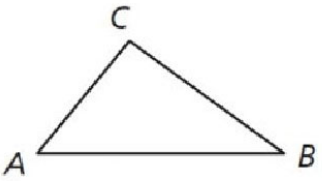
115°

$m\angle 1 = m\angle A + m\angle B$

$115 = 70 + 45$

The Triangle Sum Theorem

The sum of the angle measures in a triangle is 180°.



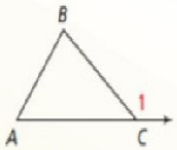
$m\angle A + m\angle B + m\angle C = 180°$

Theorem

Theorem 5.2 Exterior Angle Theorem

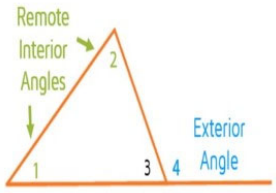
The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.

Proof Ex. 42, p. 237



$m\angle 1 = m\angle A + m\angle B$

The Exterior Angle Theorem says that if you add the measures of the two remote interior angles, you get the measure of the exterior angle.

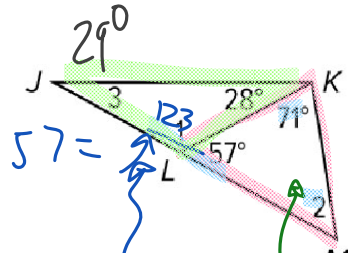


$m\angle 1 + m\angle 2 = m\angle 4$

Apply Example 1
Use the Triangle Angle-Sum Theorem

Find the measure of each numbered angle.

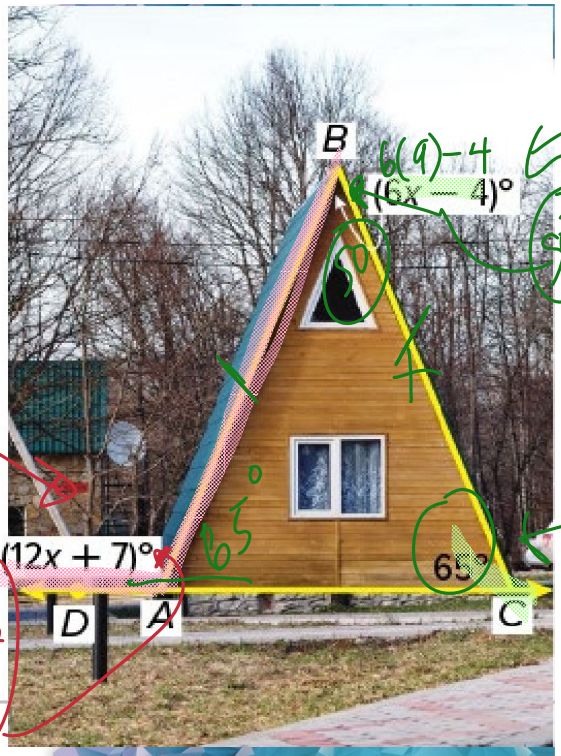
123+28=
151
180-151= 29°



29°
180-57= 123
57+71= 128
180-128 52°
71+52

Example 2
Use the Exterior Angle Theorem

ARCHITECTURE Find the measure of ∠*DAB* in the front face of the building.



6x-4+65= 12x+7
6x+61=12x+7
-7 -7
6x + 54 = 12x
-6x -6x
54 = 6x
6 6
X=9

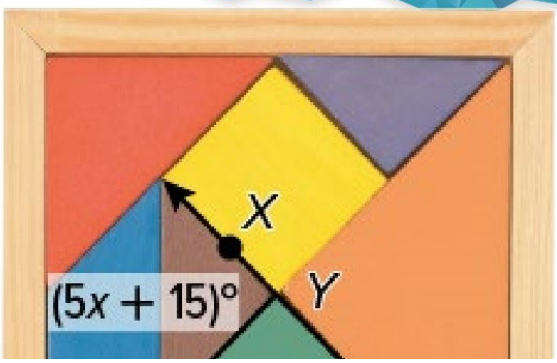
∠DAB exterior angle

6(9)-4
50 Remote Interior angles
12(9)+7
108+7
115°

Example 2
Use the Exterior Angle Theorem

Check

PUZZLES Find the measure of ∠*XYZ*.

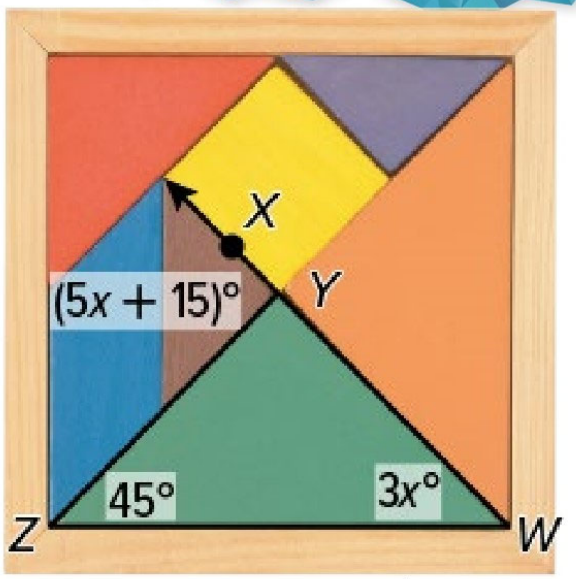


Example 2

Use the Exterior Angle Theorem

Check

PUZZLES Find the measure of ∠*XYZ*.



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