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CONGRUENCY AND SIMILARITIES

39 Interactive slides
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OCTOBER 28, 2014

Geometry Lesson 4-2

The sum of all the angles of a triangle is 180° .

An **AUXILIARY LINE** is a line that is added to a figure to aid in solving a proof.

Corollary: The acute angles of a right triangle are **COMPLEMENTARY**.

Corollary: The measure of each angle of an equilateral triangle is 60° .

An **interior angle** is located inside the triangle. Example: $\angle 1, \angle 2, \angle 3$

An **exterior angle** is located outside the triangle by an extension of one of the sides. Example: $\angle 4$

A **REMOTE INTERIOR ANGLE** is an angle that is not adjacent to the exterior angle.
 Example: $\angle 1$ AND $\angle 2$ are remote interior angles to $\angle 4$

Exterior Angle Theorem: The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles.
 Explanation: $\angle 3$ SUPP. $\angle 4$
 $m\angle 3 + m\angle 4 = 180^\circ$
 $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$
 $m\angle 3 + m\angle 4 = m\angle 1 + m\angle 2 + m\angle 3$ ← SUBTRACT $m\angle 3$ FROM BOTH SIDES
 $m\angle 4 = m\angle 1 + m\angle 2$

Third Angles Theorem: If two angles of one triangle are congruent to two angles of another triangle, then the third pair of angles is congruent.
 Examples: $\angle N \cong \angle T$, $\angle M \cong \angle P$

1. Find each angle measure below using the diagram

a. $m\angle XYZ$
 $x + 62 + 40 = 180$
 $x + 102 = 180$
 $x = 78$
 $m\angle XYZ = 78^\circ$

b. $m\angle YWZ$
 * NEED $m\angle YXW$
 $180 - 62 = 118^\circ$
 $x + 118 + 12 = 180$
 $x + 130 = 180$
 $x = 50$
 $m\angle YWZ = 50^\circ$

2. a. The measure of one acute angle in a right triangle is 63.7° . What is the measure of the other acute angle?
 $m\angle A + m\angle C = 90$
 $63.7 + m\angle C = 90$
 $m\angle C = 26.3$

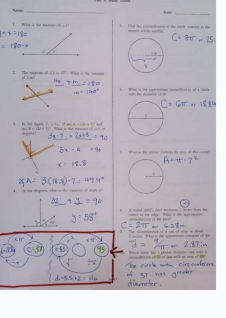
b. The measure of one acute angle in a triangle is $2x^\circ$. What is the measure of the other acute angle?
 RIGHT
 $m\angle A + m\angle C = 90$
 $2x + m\angle C = 90$
 $m\angle C = 90 - 2x$ ← NOT GIVEN AN ANGLE MEASURE IN DEGREES, DO LEAVE X IN THIS ANSWER

Key Ideas

Isosceles Triangle
 An **isosceles triangle** has at least two sides that are **congruent** (have the same length).

Equilateral Triangle
 An **equilateral triangle** has three congruent sides.
 An equilateral triangle is also **equiangular** (three congruent angles).

ABCD \cong XYZL



Civic Engagement Day: goo.gl/JaU5yE Unit 1: Transformations and Congruence: Module 1: Tools of Geometry Mod 1 Scale/Standards Module 2: Transformation and Symmetry Mod 2 Scale/Standards Module 3: Congruent Figures Mod 3 Scale/Standard Lesson 3.1: Sequences of Transformations pg. 108 #1-7 odd, 9-12, 19, 21
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12. 1. Name all angles congruent to $\angle 1$. 4. For the triangles shown, state the additional congruency statement needed to prove $BCD \cong QRS$ for the given theorem. a. SAS Theorem b. ASA Theorem 3. Write an equation for the line that passes through $(2, 5)$ and is parallel to $3x + 4y = 8$. 5. Write an equation for the line that passes through $(10, 0)$ and is perpendicular to $3x + 4y = 7$. 6. For 67, use the figure. 6. What is the sum of the interior angles of this polygon? 7. Using only the sum found above, is it possible to determine the measure of each angle in the figure? Explain why or why not. 10. Can a triangle have side lengths 5, 8, and 13? Explain why or why not.

8. Derrick states that DEF is an isosceles triangle. Is Derrick correct? Explain.

or why not. _____ UNIT 2 a_zecyText BoxModules 5-8a_zecyHighlightName _____ Date _____ Class _____ Original content Copyright by Houghton Mifflin Harcourt. Additions and changes to the original content are the responsibility of the instructor. 119 Lines, Angles, and Triangles Unit Test: BFor 1112, use the figure. 11. If $DE = 6x$, what is the perimeter of the triangle in terms of x ? _____ 12. Can you determine $m\angle D$ with only the information shown? If so, state the measure. If not, explain why not. _____ 14. Which points of concurrency must lie inside a triangle? Explain. _____ 13. The sides of a triangle measure 8 meters and 12 meters. What are the possible side lengths for the third side? Show your work. _____ For 1516, use the figure. BCD is shown. 15. Explain how to determine the centroid for $\triangle BCD$. _____ 16. Where is the centroid for $\triangle BCD$ located? _____ Use the figure for 1719. Fill in blanks for the paragraph proof. Given: $\triangle ABC \cong \triangle BDE$ Prove: $BA \cong BC$ 17. It is given that $\triangle ABC \cong \triangle BDE$ It is true that $\angle B \cong \angle B$ because _____. 18. Therefore, $\triangle BDA \cong \triangle BEC$ by the _____. 19. Thus, $BA \cong BC$ because _____. UNIT 2 Name _____ Date _____ Class _____ Original content Copyright by Houghton Mifflin Harcourt. Additions and changes to the original content are the responsibility of the instructor. 30 Response to Intervention Post-Test: Congruent Figures Use the figures for 13. 1. List the corresponding angles. _____ 2. List the corresponding sides. _____ 3. Write a congruence statement for the triangles. _____ For 45, use $\triangle JKM \cong \triangle PQR$ 4. If $m\angle P = 86$ and $m\angle R = 21$, what is $m\angle J$? _____ 5. If $JM = 14$ inches and $MK = 25$ inches, what is the length of RQ ? _____ 6. The following congruence statement represents the corresponding parts of two congruent triangles. BCD RST Choose True or False for each statement. A BC ST True False B CB SR True False C C S True False D DB TRS True False Use the following information for 79. The trapezoids below are congruent. 7. What is the length of PS ? _____ 8. Which angle is congruent to $\angle B$? _____ 9. Which side is longer, QR or RS ? _____ For 1013, use the figure and the congruence statement $\triangle JKM \cong \triangle PQR$ 10. What is the measure of $\angle Q$? _____ 11. What is the measure of $\angle M$? _____ 12. What is the length of PQ ? _____ 13. If the perimeter of triangle PQR is 20 centimeters, what is the perimeter of triangle JKM ? _____ SKILL 7 a_zecyText BoxModule 9 Reviewa_zecyHighlightName _____ Date _____ Class _____ Original _____

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