LESSON 4.6

NAME ________________________________ DATE ____________

Practice with Examples

For use with pages 236–242

GOAL Use properties of isosceles, equilateral, and right triangles

Vocabulary

If an isosceles triangle has exactly two congruent sides, the two angles adjacent to the base are **base angles.**

If an isosceles triangle has exactly two congruent sides, the angle opposite the base is the **vertex angle.**

Theorem 4.6 Base Angles Theorem
If two sides of a triangle are congruent, then the angles opposite them are congruent.

Theorem 4.7 Converse of the Base Angles Theorem
If two angles of a triangle are congruent, then the sides opposite them are congruent.

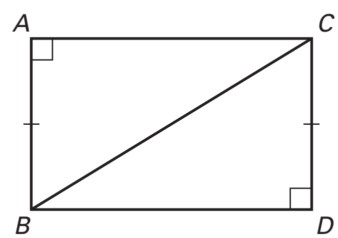
Corollary to Theorem 4.6
If a triangle is equilateral, then it is equiangular.

Corollary to Theorem 4.7
If a triangle is equiangular, then it is equilateral.

Theorem 4.8 Hypotenuse-Leg (HL) Congruence Theorem
If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of a second right triangle, then the two triangles are congruent.

EXAMPLE 1 *Using Properties of Right Triangles*

Given that $\angle A$ and $\angle D$ are right angles and $\overline{AB} \cong \overline{DC}$. show that $\triangle ABC \cong \triangle DCB$.



Solution

Paragraph proof You are given that $\angle A$ and $\angle D$ are right angles. By definition, $\triangle ABC$ and $\triangle DCB$ are right triangles. You are also given that a leg of $\triangle ABC$, $\overline{AB}$, is congruent to a leg of $\triangle DCB$, $\overline{DC}$. You know that the hypotenuses of these two triangles, $\overline{BC}$ for both triangles, are congruent because $\overline{BC} \cong \overline{BC}$ by the Reflexive Property of Congruence. Thus, by the Hypotenuse-Leg Congruence Theorem, $\triangle ABC \cong \triangle DCB$.

Chapter 4

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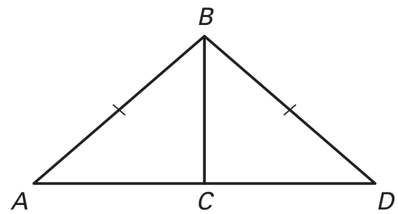
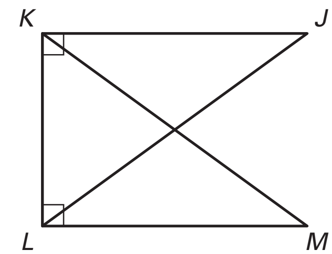
Exercises for Example 1

Write a paragraph proof.

1. Given: $\overline{BC} \perp \overline{AD}$, $\overline{AB} \cong \overline{DB}$
Prove: $\triangle ABC \cong \triangle DBC$

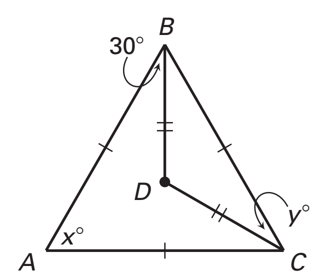


2. Given: $m\angle JKL = m\angle MLK = 90°$, $\overline{JL} \cong \overline{MK}$
Prove: $\overline{JK} \cong \overline{ML}$



EXAMPLE 2 *Using Equilateral and Isosceles Triangles*

Find the values of x and y.



SOLUTION

Notice that $\triangle ABC$ is an equilateral triangle. By the Corollary to Theorem 4.6, $\triangle ABC$ is also an equiangular triangle. Thus $m\angle A = m\angle ABC = m\angle ACB = 60°$. So, $x = 60$.

Notice also that $\triangle DBC$ is an isosceles triangle, and thus by the Base Angles Theorem, $m\angle DBC = m\angle DCB$. Now, since $m\angle ABC = m\angle ABD + m\angle DBC$, $m\angle DBC = 60 - 30 = 30$. Thus, $y = 30$ by substitution.

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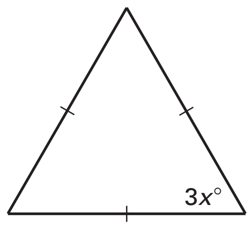
Exercises for Example 2

Find the values of *x* and *y*.

3.



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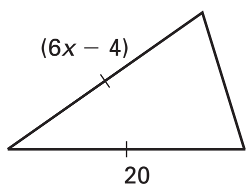

5.