#### **4-6** Triangle Congruence by ASA, AAS, and HL

- 1. to apply the ASA postulate, the AAS Theorem and the HL Theorem in problem solving
- 2. to prove two triangles congruent using the ASA postulate, the AAS Theorem and the HL Theorem

## OBJECTIVES

#### EXTRA PROBLEM

**Given:**  $\overline{BD}$  is the perpendicular bisector of  $\overline{AC}$ .

**Prove:**  $\triangle BAD \cong \triangle BCD$ 

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Statements	Reasons

### EXTRA PROBLEM

**Given:**  $\overline{BD}$  is the perpendicular bisector of  $\overline{AC}$ .

**Prove:**  $\triangle BAD \cong \triangle BCD$ 



Statements	Reasons
1) $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$	1) Given
2) $\overline{AD} \cong \overline{CD}$	2) Definition of bisector
3) $\angle ADB$ and $\angle CDB$ are right angles.	3) Definition of ⊥
$4) \angle ADB \cong \angle CDB$	4) All right angles are congruent.
5) $\overline{DB} \cong \overline{DB}$	5) Reflexive property of $\cong$
6) $\Delta BAD \cong \Delta BCD$	6) SAS Postulate

#### **KEY CONCEPT**

If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the two triangles are congruent.



#### **KEY CONCEPT**

If two angles and a nonincluded side of one triangle are congruent to two angles and the corresponding nonincluded side of another triangle, then the triangles are congruent





#### **CLASS WORK**

**Given:**  $\angle LOM \cong \angle NPM, \overline{NM} \cong \overline{LM}$ **Prove:**  $\Delta LOM \cong \Delta NPM$ 



Statements	Reasons
$1. \angle LOM \cong \angle NPM; \overline{NM} \cong \overline{LM}$ $2. \angle LMO \cong \angle NMP$ $3. \Delta LOM \cong \Delta NPM$	<ol> <li>Given</li> <li>Vertical angles theorem</li> <li>AAS Theorem</li> </ol>

#### VOCABULARY

Parts of a Right Triangle:





### **CLASS WORK**

Complete the proof.

**Given:**  $\angle V$  and  $\angle W$  are right angles

and  $\overline{WZ} \cong \overline{VX}$ **Prove:**  $\triangle WVZ \cong \triangle VWX$ 



Statements		Reasons
1)	$\angle V \And \angle W$ are right angles; $\overline{WZ} \cong \overline{VX}$	1) Given
2)	$\Delta WVZ$ and $\Delta VWX$ are right triangles	2) Definition of right triangles
3)	$\overline{VW} \cong \overline{VW}$	3) Reflexive property of congruence
4)	$\Delta WVZ \cong \Delta VWX$	4) HL Theorem

## EXIT PROBLEM

**Given:**  $\overline{JM}$  bisects  $\angle J$ .  $\overline{JM} \perp \overline{KL}$ **Prove:**  $\Delta JMK \cong \Delta JML$ 

Statements

#### Reasons

1.  $\overline{JM}$  bisects  $\angle J$ ;  $\overline{JM} \perp \overline{KL}$ 2. $\angle KJM \cong \angle LJM$ 3.  $\angle JML$  and  $\angle JMK$  are right angles 4.  $\angle JML \cong \angle JMK$ 5.  $\overline{JM} \cong \overline{JM}$ 6.  $\Delta JMK \cong \Delta JML$ 

#### 1. Given

- 2. Definition of angle bisector
- 3. Definition of perpendicular
- 4. All right angles are congruent

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- 5. Reflexive property of  $\cong$
- 6. ASA Postulate

Two prove triangles congruent you can have

- 1. Three sides (SSS)
- 2. Two sides and the included angle (SAS)
- 3. Two angles and an included side (ASA)
- 4. Two angles and a nonincluded side(AAS)
- 5. Right triangles only: hypotenuse leg (HL)

# SUMMARY

# LEARNING RUBRIC

- Got It: Proves congruent triangles using proofs with complex diagrams/less direct congruence given
- Almost There: Proves congruent triangles using proofs with simple diagrams/mostly direct congruence given
- Moving Forward: Informally identifies the reason for congruent triangles
- Getting Started: Identifies included angles

### HOMEWORK

Pages 265 - 266 11 - 17 all; 19, 22, 23, 26, 28