$$
4-6
$$

## Triangle Congruence by ASA, AAS, and HL

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

## OBJECTIVES

## EXTRA PROBLEM <br> Given: $\overline{B D}$ is the perpendicular bisector of $\overline{A C}$. <br> Prove: $\triangle B A D \cong \triangle B C D$ <br> 


Statements

1) $\overline{B D}$ is the perpendicular bisector of $\overline{A C}$

## Reasons

1) $\overline{B D}$ is the perpendicular bisector of $\overline{A C}$
2) Given
3) $\overline{A D} \cong \overline{C D}$
4) Definition of bisector
5) $\angle A D B$ and $\angle C D B$ are right angles.
6) Definition of $\perp$
7) $\angle A D B \cong \angle C D B$
8) All right angles are congruent.
9) $\overline{D B} \cong \overline{D B}$
10) Reflexive property of $\cong$
11) $\triangle B A D \cong \triangle B C D$
12) 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

Name two triangles $\triangle \mid J H \approx \triangle L \mathrm{~km}$ that are congruent by ASA. $\triangle X Y Z \approx \triangle$ SRT 2.


## CLASS WORK

Given: $\angle L O M \cong \angle N P M, \overline{N M} \cong \overline{L M}$
Prove: $\triangle L O M \cong \triangle N P M$


Statements

1. $\angle L O M \cong \angle N P M ; \overline{N M} \cong \overline{L M}$
2. $\angle L M O \cong \angle N M P$
3. $\triangle L O M \cong \triangle N P M$

## Reasons

1. Given
2. Vertical angles theorem
3. AAS Theorem

## VOCABULARY

Parts of a Right Triangle:


The right angle always points to the hypotenuse.

# KEY CONCEPT 

Hypotenuse-Leg Theorem (HL)

If $\triangle \mathrm{ABC}$ and $\triangle \mathrm{DEF}$ are right triangles,

$$
\overline{A B} \cong \overline{D E}, \text { and } \overline{A C} \cong \overline{D F},
$$ then $\triangle \mathrm{ABC} \cong \triangle \mathrm{DEF}$

If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and a leg of another right triangle, then the triangles are congruent.

## CLASS WORK

Complete the proof.
Given: $\angle V$ and $\angle W$ are right angles

$$
\text { and } \overline{W Z} \cong \overline{V X}
$$

Prove: $\triangle W V Z \cong \triangle V W X$


## Statements

## Reasons

1) $\angle V \& \angle W$ are right angles; $\overline{W Z} \cong \overline{V X}$
2) $\triangle W V Z$ and $\triangle V W X$ are right triangles
3) $\overline{V W} \cong \overline{V W}$
4) $\Delta W V Z \cong \triangle V W X$
5) Given
6) Definition of right triangles
7) Reflexive property of congruence
8) HL Theorem

## Statements

## Reasons

1. $\overline{J M}$ bisects $\angle J ; \overline{J M} \perp \overline{K L}$
2. $\angle K J M \cong \angle L J M$
3. $\angle J M L$ and $\angle J M K$ are right angles
4. $\angle J M L \cong \angle J M K$
5. $\overline{J M} \cong \overline{J M}$
6. $\Delta J M K \cong \triangle J M L$
7. Given
8. Definition of angle bisector
9. Definition of perpendicular
10. All right angles are congruent
11. Reflexive property of $\cong$
12. ASA Postulate

Two prove triangles congruent you can hav 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

