Lesson 4-3: Triangle Congruence: ASA & AAS

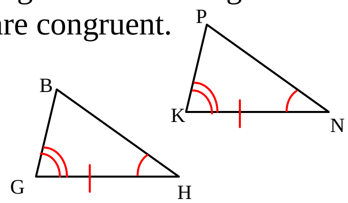
Other ways of determining triangle congruence

Last lesson we learned that we didn't need to determine all corresponding angles and sides are congruent for triangle congruence. We learned that if we determined all sides are congruent, then the triangles are congruent (SSS). We also learned that if two corresponding sides and the included angle are congruent, the triangles are congruent (SAS).

Today we will learn two more ways of determining triangle congruence.

Postulate 4-3 Angle-Side-Angle (ASA) Postulate

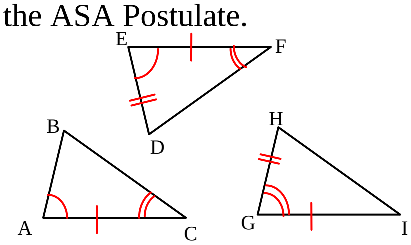
If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the two triangles are congruent.



$\Delta HGB \cong \Delta NKP$

Example – Pg 197, #2

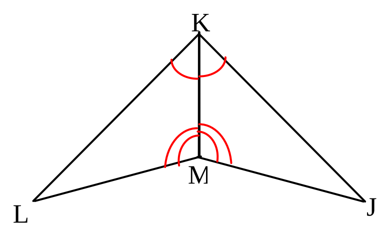
Name two triangles that are congruent by the ASA Postulate.



$\angle BAC \cong \angle DEF$
$\overline{AC} \cong \overline{EF}$
$\angle ACB \cong \angle EFD$
Therefore $\Delta ACB \cong \Delta EFD$ by ASA

Example – Pg 197, #8

Developing a proof: complete the proof by filling in the blanks.



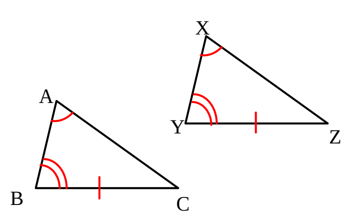
Given: $\angle LKM \cong \angle JKM$
$\angle LMK \cong \angle JMK$
Prove: $\Delta LKM \cong \Delta JKM$

Proof:	$\angle LKM \cong \angle JKM$	Given
	$\angle LMK \cong \angle JMK$	Given
	$\overline{KM} \cong \overline{KM}$	Reflexive POC
	$\Delta LKM \cong \Delta JKM$	ASA

Extending ASA…

Do you recall a theorem from lesson 4-1 that states "if two angles of one triangle are congruent to two angles of another triangle, then the thirds angles are congruent"? It is Theorem 4-1.

Let's consider the following two triangles:



Given: $\angle A \cong \angle X$, $\angle B \cong \angle Y$, $\overline{BC} \cong \overline{YZ}$
Prove: $\Delta ABC \cong \Delta XYZ$

Lesson 4-3: Triangle Congruence: ASA & AAS

Proof: $\angle A \cong \angle X$	Given
$\angle B \cong \angle Y$	Given
$\angle C \cong \angle Z$	Theorem 4-1
$\overline{BC} \cong \overline{YZ}$	Given
$\Delta ABC \cong \Delta XYZ$	ASA

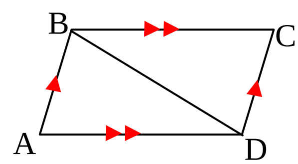
This proof allows us to state that if we have two triangles for which two angles and a non-included side are congruent then the triangles are congruent.

Theorem 4-2 Angle-Angle-Side (AAS) Theorem

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

Example – Pg. 197, #10

Tell whether the AAS Theorem or the ASA Postulate can be applied directly to prove the triangles congruent. If not, write *not possible*.

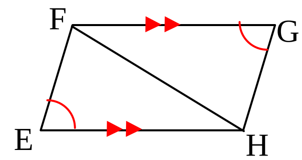


ASA; following is the reasoning…

$\angle CBD \cong \angle ADB$	If $\parallel$ lines then alt. Int. $\angle$'s are $\cong$
$\overline{BD} \cong \overline{BD}$	Reflexive POC
$\angle CDB \cong \angle ABD$	If $\parallel$ lines then alt. Int. $\angle$'s are $\cong$

Example – Not in the book

Tell whether the AAS Theorem or the ASA Postulate can be applied directly to prove the triangles congruent. If not, write *not possible*.



AAS; following is the reasoning…

$\angle E \cong \angle G$	Given
$\angle EHF \cong \angle GFH$	If $\parallel$ lines then alt. Int. $\angle$'s are $\cong$
$\overline{FH} \cong \overline{HF}$	Reflexive POC

Assign homework

p. 197 #1-25 odd, 29-33 odd, 42-45
p. 201 #1-10