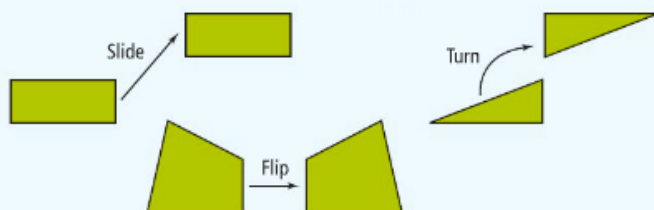


4-1 Congruent Figures

Content Standard
 Prepares for G.SRT.5 Use congruence . . .
 criteria for triangles to solve problems and prove
 relationships in geometric figures.

Objective To recognize congruent figures and their corresponding parts

Congruent figures have the same size and shape. When two figures are congruent, you can slide, flip, or turn one so that it fits exactly on the other one, as shown below. In this lesson, you will learn how to determine if geometric figures are congruent.



Essential Understanding You can determine whether two figures are congruent by comparing their corresponding parts.

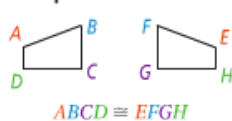
take note

Key Concept Congruent Figures

Definition

Congruent polygons have congruent corresponding parts—their matching sides and angles. When you name congruent polygons, you must list corresponding vertices in the same order.

Example



$$ABCD \cong EFGH$$

$$\overline{AB} \cong \overline{EF} \quad \overline{BC} \cong \overline{FG}$$

$$\overline{CD} \cong \overline{GH} \quad \overline{DA} \cong \overline{HE}$$

$$\angle A \cong \angle E \quad \angle B \cong \angle F$$

$$\angle C \cong \angle G \quad \angle D \cong \angle H$$

1. If $\triangle WYS \cong \triangle MKV$, what are the congruent corresponding parts?

$$\angle W \cong \angle M$$

$$\angle Y \cong \angle K$$

$$\angle S \cong \angle V$$

$$\overline{WS} \cong \overline{MV}$$

$$\overline{WY} \cong \overline{MK}$$

$$\overline{YS} \cong \overline{KV}$$

2. Suppose that $\triangle WYS \cong \triangle MKV$. If $m\angle W = 62$ and $m\angle Y = 35$, what is $m\angle V$? Explain.

$$62 + 35 + m\angle V = 180$$

$$97 + m\angle V = 180$$

$$m\angle V = 83^\circ$$

Problem 3 Finding Congruent Triangles

Are the triangles congruent? Justify your answer.

$\overline{AB} \cong \overline{ED}$ Given

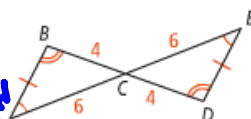
$\overline{BC} \cong \overline{DC}$ ~~Given, marked~~ **Given, marked**

$\overline{AC} \cong \overline{EC}$ ~~Given, marked~~ **Given, marked**

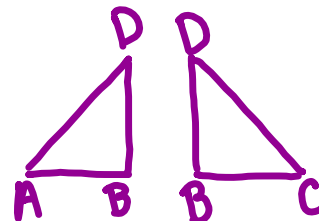
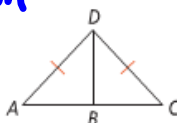
$\angle A \cong \angle E, \angle B \cong \angle D$ Given

$\angle BCA \cong \angle DCE$ ~~Vertical angles are congruent~~ **Vertical \angle Thm**

$\triangle ABC \cong \triangle EDC$ by the definition of congruent triangles.



Got It? 3. Is $\triangle ABD \cong \triangle CBD$? Justify your answer.



Statements

Reasons

1. $\overline{AD} \cong \overline{CD}$

1. Given

2. $\overline{BD} \cong \overline{BD}$

2. Reflexive Prop. of \cong ~~AAA~~

3. $\triangle ABD \not\cong \triangle CBD$

3. cannot be proven

Take note

Theorem 4-1 Third Angles Theorem

Theorem

If two angles of one triangle are congruent to two angles of another triangle, then the third angles are congruent.

If ...

$\angle A \cong \angle D$ and $\angle B \cong \angle E$



Then ...

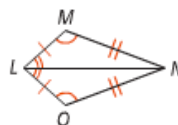
$\angle C \cong \angle F$



Problem 4 Proving Triangles Congruent

Given: $\overline{LM} \cong \overline{LO}$, $\overline{MN} \cong \overline{ON}$,
 $\angle M \cong \angle O$, $\angle MLN \cong \angle OLN$

Prove: $\triangle LMN \cong \triangle LON$

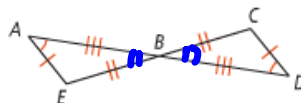


Statements	Reasons
1) $\overline{LM} \cong \overline{LO}$, $\overline{MN} \cong \overline{ON}$	1) Given
2) $\overline{LN} \cong \overline{LN}$	2) Reflexive Property of \cong
3) $\angle M \cong \angle O$, $\angle MLN \cong \angle OLN$	3) Given
4) $\angle MNL \cong \angle ONL$	4) Third Angles Theorem
5) $\triangle LMN \cong \triangle LON$	5) Definition of \cong triangles



Got It? 4. Given: $\angle A \cong \angle D$, $\overline{AE} \cong \overline{DC}$,
 $\overline{EB} \cong \overline{CB}$, $\overline{BA} \cong \overline{BD}$

Prove: $\triangle AEB \cong \triangle DCB$



Statements

Reasons

1. $\overline{AE} \cong \overline{DC}$
 $\overline{EB} \cong \overline{CB}$
 $\overline{BA} \cong \overline{BD}$
 $\angle A \cong \angle D$

1. Given

2. $\angle ABE \cong \angle DCB$

2. Vertical \angle s Thm

3. $\angle E \cong \angle C$

3. Third \angle s Thm

4. $\triangle AEB \cong \triangle DCB$

4. def. of \cong Δ s

Name

4.1

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Notes 4.2