Chapter 4: Congruent Triangles

Lesson 4.1 Congruent Figures

 Lesson 4.2 Triangle Congruence by SSS and SAS

 Lesson 4.3 Triangle Congruence by ASA and AAS

Lesson 4.4 Using Corresponding Parts of Congruent Triangles

 Lesson 4.5 Isosceles and Equilateral Triangles

 Lesson 4.6 Congruence in Right Triangles

Lesson 4.7 Congruence in Overlapping Triangles

Lesson 4.1 Congruent Figures

You are working on a puzzle. You've almost finished, except for a few pieces of the sky. Place the remaining pieces in the puzzle. How did you figure out where to place the pieces?
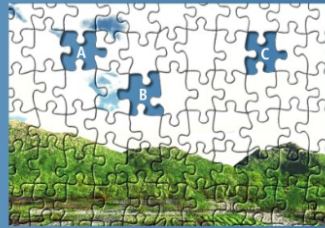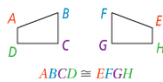

Congruent figures have the same size and shape.

Key Concept Congruent Figures

| Definition	Example
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.	$\overline{AB} \cong \overline{EF}$ $\overline{BC} \cong \overline{FG}$ $\overline{CD} \cong \overline{GH}$ $\overline{DA} \cong \overline{HE}$ $ABCD \cong EFGH$ $\angle A \cong \angle E$ $\angle B \cong \angle F$ $\angle C \cong \angle G$ $\angle D \cong \angle H$

Ex. If HIJK ≅ LMNO, what are the congruent corresponding parts.?
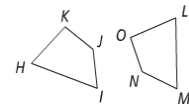
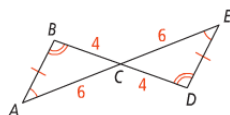1 If triangle WYS is congruent to triangle MKV, how many congruencies will there be?

2 If triangle WYS is congruent to triangle MKV, name one congruency.

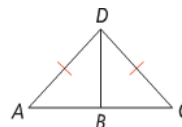The wings of an SR-71 Blackbird aircraft suggest congruent triangles. What is m<D?
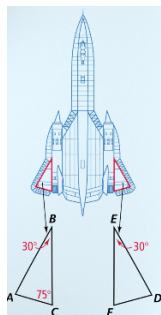
3 Suppose that triangle WYS is congruent to triangle MKV. If m<W = 62 and m<Y = 35, what is m<V?

Ex. Are the triangles congruent? Justify your answer.

4 Is triangle ABD congruent to triangle CBD?

Yes

No

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 . . .
$\angle C \cong \angle F$

Proof Proof of Theorem 4-1: Third Angles Theorem

Given: $\angle A \cong \angle D, \angle B \cong \angle E$
Prove: $\angle C \cong \angle F$

Statements	Reasons
1) $\angle A \cong \angle D, \angle B \cong \angle E$	1) Given
2) $m\angle A = m\angle D, m\angle B = m\angle E$	2) Def. of $\cong \triangle$s
3) $m\angle A + m\angle B + m\angle C = 180$, $m\angle D + m\angle E + m\angle F = 180$	3) $\triangle$ Angle-Sum Thm.
4) $m\angle A + m\angle B + m\angle C = m\angle D + m\angle E + m\angle F$	4) Subst. Prop.
5) $m\angle D + m\angle E + m\angle C = m\angle D + m\angle E + m\angle F$	5) Subst. Prop.
6) $m\angle C = m\angle F$	6) Subtraction Prop. of =
7) $\angle C \cong \angle F$	7) Def. of $\cong \triangle$s