

Grab a Bell Ringer and HW Tracker

Day 0 - Review

1. You invest \$5000 into a savings account and your money earns 3% interest each year. If you do not take any money out at any time, how much will you have in 10 years?

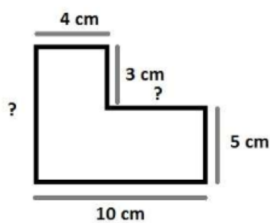
$$y = 5000(1 + .03)^{10}$$

2. Find the perimeter and area of the shape.

P =

A =

3. $f(x) = 3x - 5$ and $g(x) = 2x + 3$. Find $f(g(x))$.



Solutions

Day 0 - Review

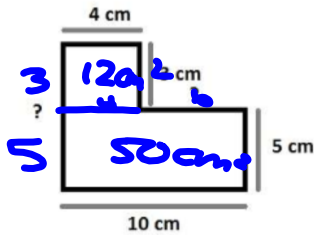
1. You invest \$5000 into a savings account and your money earns 3% interest each year. If you do not take any money out at any time, how much will you have saved in 10 years?

$$y = 5000(1.03)^{10} = \$6,719.58$$

2. Find the perimeter and area of the shape.

$$P = 36\text{cm}$$

$$A = 62\text{cm}^2$$



3. $f(x) = 3x - 5$ and $g(x) = 2x + 3$. Find $f(g(x))$.

$$f(g(x)) = 6x + 4$$

$$\begin{aligned} &3(2x + 3) - 5 \\ &6x + 9 - 5 \\ &6x + 4 \end{aligned}$$

pg 523



10-1 Congruent Figures

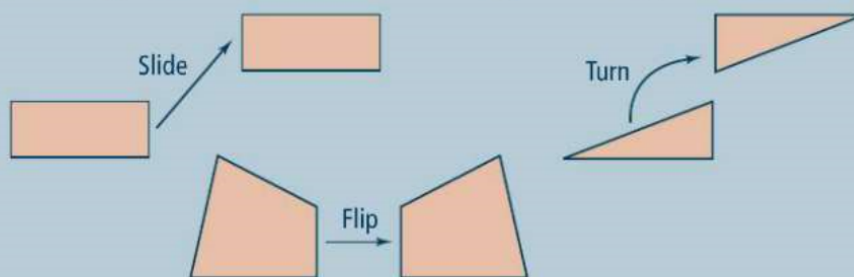
Prepares for **G.CO.7** ... Show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. Also prepares for **G.SRT.5**

p523

pg 523

Congruent

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.

p523

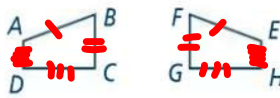


Key Concept Congruent Figures

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



$$ABCD \cong EFGH$$

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

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

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

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

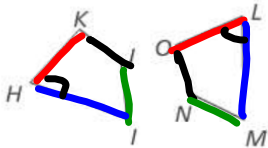
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Problem 1

Finding Congruent Parts

If $\triangle HIJK \cong \triangle LMNO$, what are the congruent corresponding parts?



$\overline{HK} \cong \overline{LO}$
 $\overline{KI} \cong \overline{ON}$
 $\overline{IJ} \cong \overline{NM}$
 $\overline{HI} \cong \overline{LM}$

★

$\angle H \cong \angle L$
 $\angle I \cong \angle M$
 $\angle J \cong \angle N$
 $\angle K \cong \angle O$

Solution

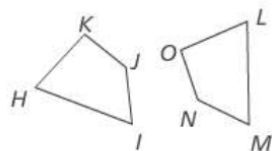


Problem 1

Finding Congruent Parts



If $HIJK \cong LMNO$, what are the congruent corresponding parts?



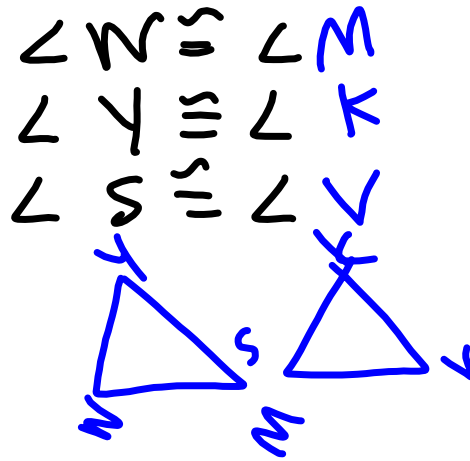
Sides: $\overline{HI} \cong \overline{LM}$ $\overline{IJ} \cong \overline{MN}$ $\overline{JK} \cong \overline{NO}$ $\overline{KH} \cong \overline{OL}$

Angles: $\angle H \cong \angle L$ $\angle I \cong \angle M$ $\angle J \cong \angle N$ $\angle K \cong \angle O$

Got it pg 524

Got It? If $\triangle WYS \cong \triangle MKV$, what are the congruent corresponding parts?

$$\begin{aligned} \overline{WY} &\cong \overline{MK} \\ \overline{YS} &\cong \overline{KV} \\ \overline{SW} &\cong \overline{VM} \end{aligned}$$



p524

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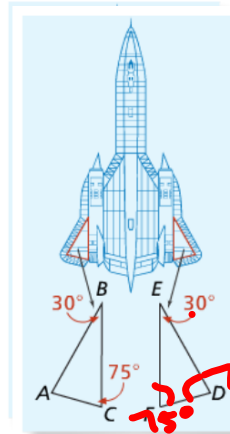
Problem 2

Using Congruent Parts



Multiple Choice The wings of an SR-71 Blackbird suggest congruent triangles.
What is $m\angle D$?

- (A) 30
- (B) 75
- (C) 105
- (D) 150



75°

$$\begin{array}{r} 180 \\ - 105 \\ \hline 75 \end{array}$$

solution



Problem 2

Using Congruent Parts



Multiple Choice The wings of an SR-71 Blackbird suggest congruent triangles.
What is $m\angle D$?

- (A) 30 (B) 75 (C) 105 (D) 150

Think

Use the Triangle Angle-Sum Theorem to write an equation involving $m\angle A$.

Solve for $m\angle A$.

$\angle A$ and $\angle D$ are corresponding parts of congruent triangles, so $m\angle A = m\angle D$.

Write

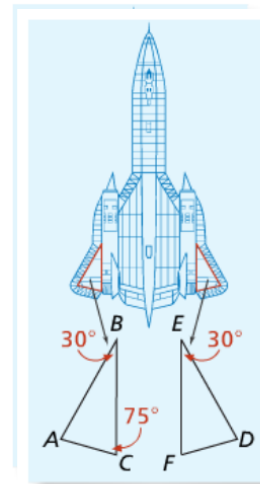
$$m\angle A + 30 + 75 = 180$$

$$m\angle A + 105 = 180$$

$$m\angle A = 75$$

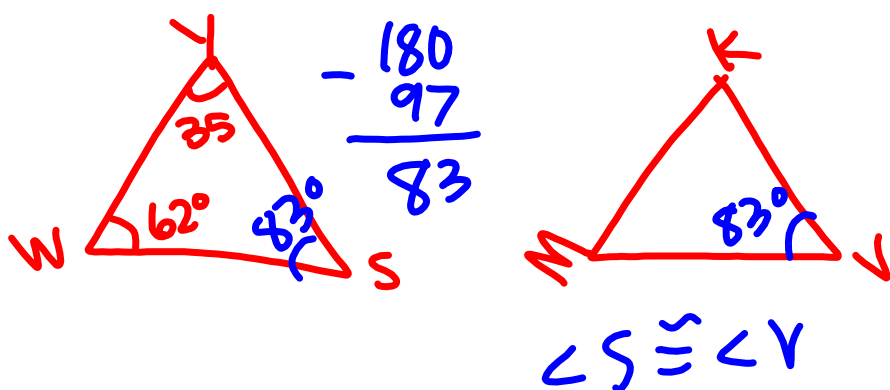
$$m\angle A = m\angle D = 75$$

The correct answer is B.



Got it pg 524

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



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Problem 3

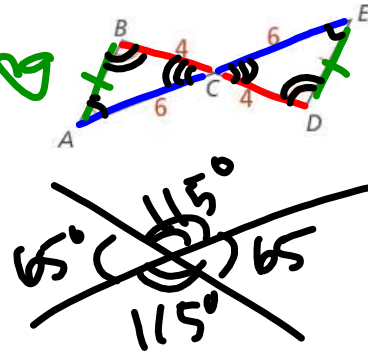
Finding Congruent Triangles



Are the triangles congruent? Justify your answer.

Yes! All 3 corresponding sides are \cong

All 3 corr. \angle s \cong



solution



Problem 3

Finding Congruent Triangles



Are the triangles congruent? Justify your answer.

Look at the side markings in the given diagram.

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

Notice that $BC = 4$ and $DC = 4$.

$$\overline{BC} \cong \overline{DC}$$

Notice that $AC = 6$ and $EC = 6$.

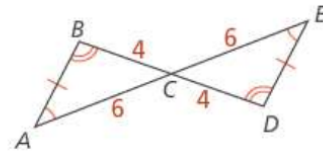
$$\overline{AC} \cong \overline{EC}$$

Look at the angle markings in the given diagram.

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

Recall from the given diagram that $\angle BCA$ and $\angle DCE$ are vertical angles.

$$\angle BCA \cong \angle DCE$$



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

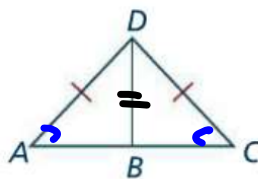
Got it pg 525

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

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

$$\overline{DB} \cong \overline{DB}$$

$$\angle A \cong \angle C$$



Not enough info

p525

pg 526

The next theorem follows from the Triangle Angle-Sum Theorem, which states that the sum of the measures of the angles in a triangle is 180.

take note

Theorem 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 ...

$$\angle A \cong \angle D \text{ and } \angle B \cong \angle E$$

**Then ...**

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

p526

pg 526

Proof Proof of Theorem 1: Third Angles Theorem**Given:** $\angle A \cong \angle D, \angle B \cong \angle E$ **Prove:** $\angle C \cong \angle F$ 

Solution...

Proof Proof of Theorem 1: Third Angles TheoremGiven: $\angle A \cong \angle D, \angle B \cong \angle E$ 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 $\cong \triangle$
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 $\cong \triangle$



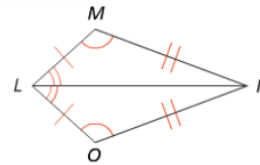
Problem 4

Proving Triangles Congruent



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

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

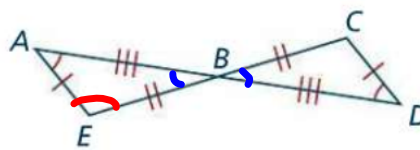


Statements	Reasons
1) $\overline{LM} \cong \overline{LO}$, $\overline{MN} \cong \overline{ON}$	1) Given
2) $\overline{LN} \cong \overline{LN}$	2) Reflexive Property of \cong
3) $\angle M \cong \angle O$, $\angle MLN \cong \angle OLN$	3) Given
4) $\angle MNL \cong \angle ONL$	4) Third Angles Theorem

Got it pg 527

Got It? 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
$\overline{AE} \cong \overline{DC}$	Given
$\overline{EB} \cong \overline{CB}$	Given
$\overline{BA} \cong \overline{BD}$	Given
$\angle A \cong \angle D$	Given
$\angle ABE \cong \angle DCB$	Vertical \angle s are \cong
$\angle E \cong \angle C$	3rd Angles Thm
$\triangle AEB \cong \triangle DCB$	Def of $\cong \triangle$ s

ps27

hw 10.1 #s 2-6, 8-11, 13-23