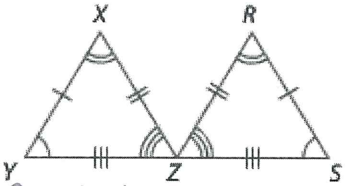
4.3b Classwork

Mon (11/16)

Key

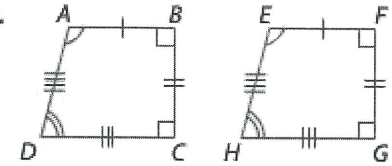
(pg. 1) **Show that polygons are congruent by identifying all congruent corresponding parts. Then write a congruence statement.**

1.



$\angle X \cong \angle R$, $\angle Y \cong \angle S$, $\angle Z \cong \angle Z$
$XY \cong RS$ $XZ \cong RZ$, $YZ \cong ZS$
$\triangle XYZ \cong \triangle RSZ$

2.

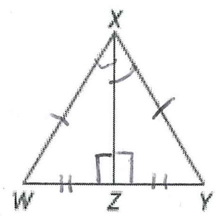


$ABCD \cong EFGH$

8. PROOF Write a paragraph proof.

Given: $\angle WXZ \cong \angle YXZ$, $\angle XZW \cong \angle XZY$, $\overline{WX} \cong \overline{YX}$, $\overline{WZ} \cong \overline{YZ}$

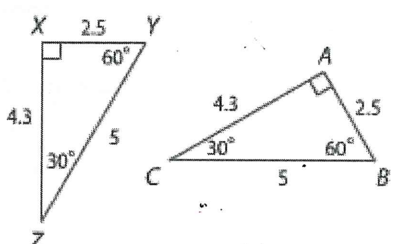
Prove: $\triangle WXZ \cong \triangle YXZ$



Statement	Reason
1) $\angle WXZ \cong \angle YXZ$, $\angle XZW \cong \angle XZY$	Given
2) $XZ \cong XZ$	Reflexive property of congruence
3) $\angle W \cong \angle Y$	Third Angle Theorem
4) $\triangle WXZ \cong \triangle YXZ$	

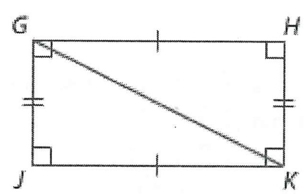
Show that polygons are congruent by identifying all congruent corresponding parts. Then write a congruence statement.

9.



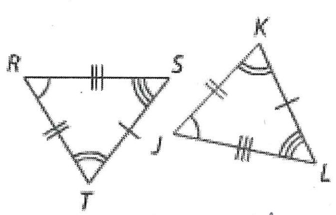
$\angle X \cong \angle A$, $\angle Y \cong \angle B$
$\angle Z \cong \angle C$ $XY \cong AB$
$XZ \cong AC$ $YZ \cong BC$
$\triangle XYZ \cong \triangle ABC$

10.



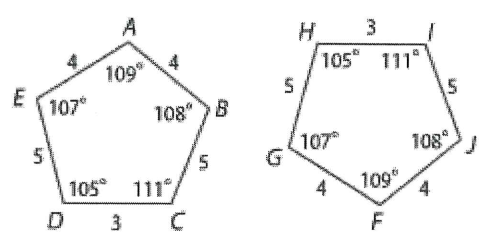
$\angle J \cong \angle H$, $\angle JGK \cong \angle HKG$
$\angle KGH \cong \angle GKJ$ $GJ \cong GK$
$\triangle GJK \cong \triangle KHG$

11.



$\angle R = \angle J$, $\angle T = \angle K$, $\angle S = \angle L$
$RT = JK$ $TS = KL$ $RS = JL$
$\triangle RTS \cong \triangle JKL$

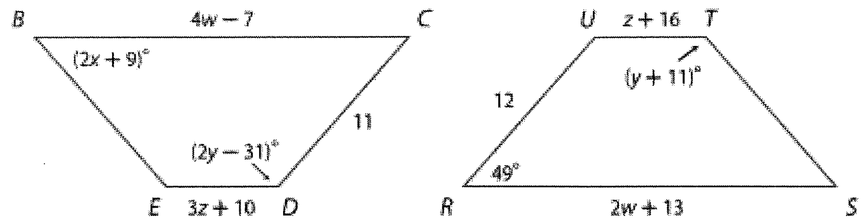
12.



$ABCDE \cong FJIHG$

(Pg. 2)

Polygon $BCDE \cong$ polygon $RSTU$. Find each value.



$B \cong R$ | $T \cong D$ | $UT \cong ED$ | $RS \cong BC$

13. x

$2x+9=49$

$2x=40$ $\boxed{x=20}$

14. y

$2y-31=y+11$

$\boxed{y=42}$

15. z

$3z+10=z+16$

$2z=6$

$\boxed{z=3}$

16. w

$4w-7=2w+13$

$2w=20$

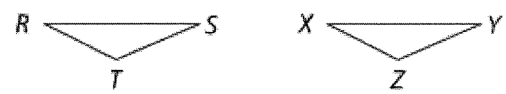
$\boxed{w=10}$

22. PROOF Put the statements used to prove the statement below in the correct order. Provide the reasons for each statement.

Congruence of triangles is symmetric. (Theorem 4.4)

Given: $\triangle RST \cong \triangle XYZ$

Prove: $\triangle XYZ \cong \triangle RST$



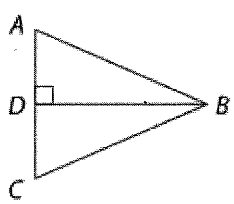
Proof:

$\angle X \cong \angle R$, $\angle Y \cong \angle S$, $\angle Z \cong \angle T$, $\overline{XY} \cong \overline{RS}$, $\overline{YZ} \cong \overline{ST}$, $\overline{XZ} \cong \overline{RT}$	$\angle R \cong \angle X$, $\angle S \cong \angle Y$, $\angle T \cong \angle Z$, $\overline{RS} \cong \overline{XY}$, $\overline{ST} \cong \overline{YZ}$, $\overline{RT} \cong \overline{XZ}$	$\triangle RST \cong \triangle XYZ$	$\triangle XYZ \cong \triangle RST$
?	?	?	?

Write a 2-column Proof

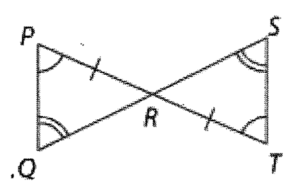
23. Given: $\overline{BD}$ bisects $\angle B$.
$\overline{BD} \perp \overline{AC}$

Prove: $\angle A \cong \angle C$



24. Given: $\angle P \cong \angle T$, $\angle S \cong \angle Q$
$\overline{TR} \cong \overline{PR}$, $\overline{RP} \cong \overline{RQ}$,
$\overline{RT} \cong \overline{RS}$
$\overline{PQ} \cong \overline{TS}$

Prove: $\triangle PRQ \cong \triangle TRS$



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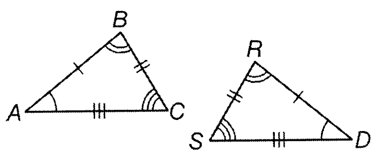
4-3 Practice

Congruent Triangles

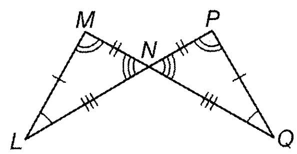
Show that the polygons are congruent by indentifying all congruent corresponding parts. Then write a congruence statement.

1.



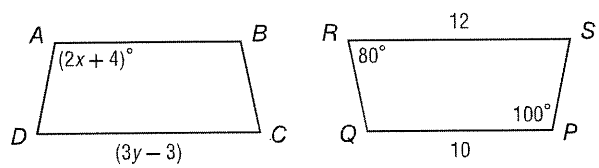
$\angle A \cong \angle D$; $\angle B \cong \angle R$
$\angle C \cong \angle S$; $\overline{AB} \cong \overline{DR}$
$\overline{BC} \cong \overline{RS}$; $\overline{AC} \cong \overline{DS}$
$\triangle ABC \cong \triangle DRS$

2.



$\angle L \cong \angle Q$; $\angle M \cong \angle P$
$\angle MNL \cong \angle PNQ$;
$\overline{LM} \cong \overline{QP}$; $\overline{MN} \cong \overline{PN}$
$\overline{LN} \cong \overline{QN}$
$\triangle LMN \cong \triangle QPN$

Polygon $ABCD \cong$ **polygon** $PQRS$.



3. Find the value of x.

$x = 48$

4. Find the value of y.

$y = 5$

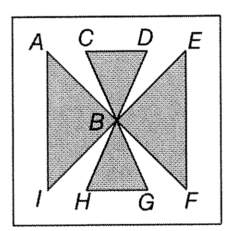
5. PROOF Write a two-column proof.
Given: $\angle P \cong \angle R$, $\angle PSQ \cong \angle RSQ$, $\overline{PQ} \cong \overline{RQ}$, $\overline{PS} \cong \overline{RS}$

Prove: $\triangle PQS \cong \triangle RQS$

Proof:

Statements	Reasons
1. $\angle P \cong \angle R$, $\angle PSQ \cong \angle RSQ$	1. Given
2. $\angle PQS \cong \angle RQS$	2. Third Angle Theorem
3. $\overline{PQ} \cong \overline{RQ}$, $\overline{PS} \cong \overline{RS}$	3. Given
4. $\overline{QS} \cong \overline{QS}$	4. Reflexive Property
5. $\triangle PQS \cong \triangle RQS$	5. CPCTC

6. QUILTING



a. Indicate the triangles that appear to be congruent.
$\triangle ABI \cong \triangle EBF$, $\triangle CBD \cong \triangle HBG$

b. Name the congruent angles and congruent sides of a pair of congruent triangles.
Sample answer: $\angle A \cong \angle E$, $\angle ABI \cong \angle EBF$, $\angle I \cong \angle F$;
$\overline{AB} \cong \overline{EB}$, $\overline{BI} \cong \overline{BF}$, $\overline{AI} \cong \overline{EF}$

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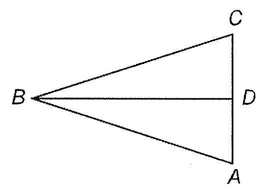
4-3 Study Guide and Intervention *(continued)*

Congruent Triangles

Prove Triangles Congruent Two triangles are congruent if and only if their corresponding parts are congruent. Corresponding parts include corresponding angles and corresponding sides. The phrase "if and only if" means that both the conditional and its converse are true. For triangles, we say, "Corresponding parts of congruent triangles are congruent," or CPCTC.

Example **Write a two-column proof.**



Given: $\overline{AB} \cong \overline{CB}$, $\overline{AD} \cong \overline{CD}$, $\angle BAD \cong \angle BCD$
$\overline{BD}$ bisects $\angle ABC$.

Prove: $\triangle ABD \cong \triangle CBD$

Proof:

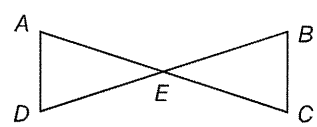
Statement	Reason
1. $\overline{AB} \cong \overline{CB}$, $\overline{AD} \cong \overline{CD}$	**1.** Given
2. $\overline{BD} \cong \overline{BD}$	**2.** Reflexive Property of congruence
3. $\angle BAD \cong \angle BCD$	**3.** Given
4. $\angle ABD \cong \angle CBD$	**4.** Definition of angle bisector
5. $\angle BDA \cong \angle BDC$	**5.** Third Angles Theorem
6. $\triangle ABD \cong \triangle CBD$	**6.** CPCTC

Exercises

Write a two-column proof.

1. Given: $\angle A \cong \angle C$, $\angle D \cong \angle B$, $\overline{AD} \cong \overline{CB}$, $\overline{AE} \cong \overline{CE}$,
$\overline{AC}$ bisects $\overline{BD}$.

Prove: $\triangle AED \cong \triangle CEB$



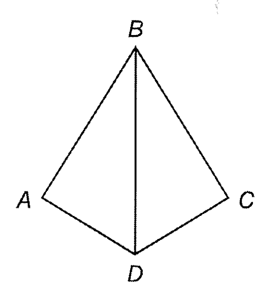
Proof:

Statements	Reasons
1. $\angle A \cong \angle C$, $\angle D \cong \angle B$	**1. Given**
2. $\angle AED \cong \angle CEB$	**2. Vertical angles are $\cong$.**
3. $\overline{AD} \cong \overline{CB}$, $\overline{AE} \cong \overline{CE}$	**3. Given**
4. $\overline{DE} \cong \overline{BE}$	**4. Definition of segment bisector**
5. $\triangle AED \cong \triangle CEB$	**5. CPCTC**

Write a paragraph proof.

2. Given: $\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$,
$\overline{AB} \cong \overline{CB}$, $\overline{AB} \cong \overline{AD}$, $\overline{CB} \cong \overline{DC}$

Prove: $\triangle ABD \cong \triangle CBD$



We are given $\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$. Therefore $\angle ABD \cong \angle CBD$ and $\angle ADB \cong \angle CDB$ by the definition of angle bisectors. By the Third Angle Theorem, we find that $\angle A \cong \angle C$. We are given that $\overline{AB} \cong \overline{CB}$, $\overline{AB} \cong \overline{AD}$, and $\overline{CB} \cong \overline{DC}$. Using the substitution property, we can determine that $\overline{AD} \cong \overline{CD}$. Finally, $\overline{BD} \cong \overline{BD}$ using the Reflexive Property of congruence. Therefore $\triangle ABD \cong \triangle CBD$ by CPCTC.

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