Name ______________________________ Class ____________ Date ____________

Extra Practice

Chapter 4

Lesson 4-1

$\triangle SAT \cong \triangle GRE$. Complete each congruence statement.

1. $\angle S \cong$ __?__ ***∠G***

2. $\overline{GR} \cong$ __?__ ***$\overline{SA}$***

3. $\angle E \cong$ __?__ ***∠T***

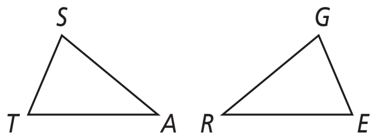
4. $\overline{AT} \cong$ __?__ ***$\overline{RE}$***

5. $\triangle ERG \cong$ __?__ ***△TAS***

6. $\overline{EG} \cong$ __?__ ***$\overline{TS}$***

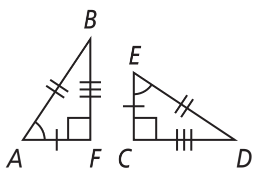
7. $\triangle REG \cong$ __?__ ***△ATS***

8. $\angle R \cong$ __?__ ***∠A***



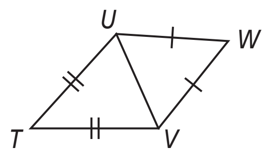
State whether the figures are congruent. Justify your answers.

9. $\triangle ABF$; $\triangle EDC$



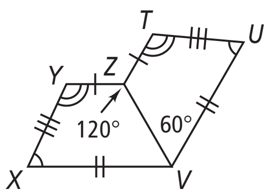
Yes; corr. sides and corr. ∠s are ≅.

10. $\triangle TUV$; $\triangle UVW$



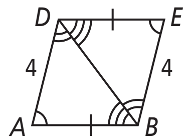
No; the only known corr. part that is ≅ is $\overline{UV}$.

11. ▱$XYZV$; ▱$UTZV$



Yes; corr. sides and corr. ∠s are ≅.

12. $\triangle ABD$; $\triangle EDB$

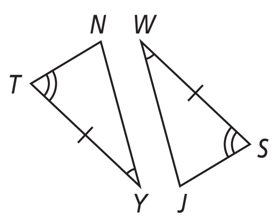


Yes; corr. sides and corr. ∠s are ≅.

Lessons 4-2 and 4-3

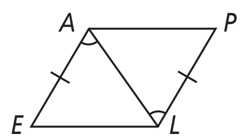
Can you prove the two triangles congruent? If so, write the congruence statement and name the postulate you would use. If not, write *not possible* and tell what other information you would need.

13.



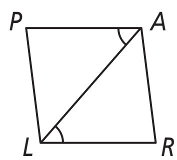
∠T ≅ ∠S, ∠Y ≅ ∠W, $\overline{TY} \cong \overline{SW}$; ASA

14.



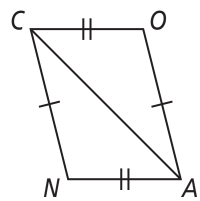
$\overline{EA} \cong \overline{PL}$, $\overline{AL} \cong \overline{LA}$, ∠EAL ≅ ∠PLA; SAS

15.



not possible

16.



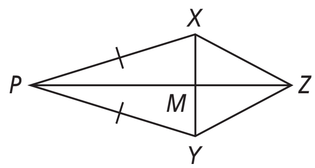
$\overline{CN} \cong \overline{AO}$; $\overline{NA} \cong \overline{OC}$, $\overline{AC} \cong \overline{CA}$; SSS

Extra Practice (continued)

Chapter 4

17. Given: $\overline{PX} \cong \overline{PY}$, $\overline{ZP}$ bisects $\overline{XY}$.

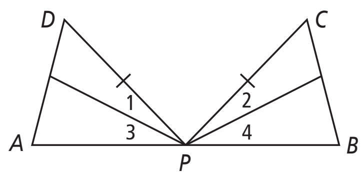
Prove: $\triangle PXZ \cong \triangle PYZ$



$\overline{ZP}$ bisects $\overline{XY}$ means that $\overline{XM} \cong \overline{YM}$. It is given that $\overline{PX} \cong \overline{PY}$, and $\overline{PM} \cong \overline{PM}$ by the Refl. Prop. of $\cong$. Thus, $\triangle PXM \cong \triangle PYM$ by SSS and $\angle XPM \cong \angle YPM$ by Def. of $\cong$. $\overline{PZ} \cong \overline{PZ}$ by the Refl. Prop. of $\cong$, so $\triangle PXZ \cong \triangle PYZ$ by SAS.

18. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, $\overline{PD} \cong \overline{PC}$, P is the midpoint of $\overline{AB}$.

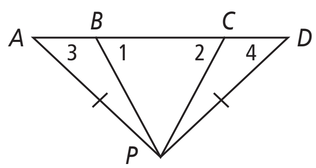
Prove: $\triangle ADP \cong \triangle BCP$



It is given that $m\angle 1 = m\angle 2$ and $m\angle 3 = m\angle 4$. By the $\angle$ Add. Post., $m\angle DPA = m\angle CPB$. Since P is the midpt. of $\overline{AB}$, $\overline{PA} \cong \overline{PB}$. It is given that $\overline{PD} \cong \overline{PC}$, so $\triangle ADP \cong \triangle BCP$ by SAS.

19. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, $\overline{AP} \cong \overline{DP}$

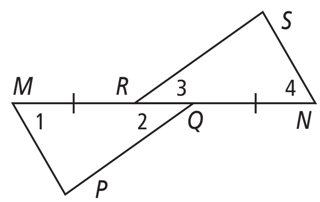
Prove: $\triangle ABP \cong \triangle DCP$



$\angle 1 \cong \angle 2$ is given. $\angle ABP \cong \angle DCP$ by the $\cong$ Suppls. Thm. $\angle 3 \cong \angle 4$ and $\overline{AP} \cong \overline{DP}$ are given. $\triangle ABP \cong \triangle DCP$ by AAS.

20. Given: $\overline{MP} \parallel \overline{NS}$, $\overline{RS} \parallel \overline{PQ}$, $\overline{MR} \cong \overline{NQ}$

Prove: $\triangle MQP \cong \triangle NRS$

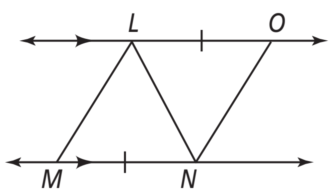


$\overline{MP} \parallel \overline{NS}$ and $\overline{RS} \parallel \overline{PQ}$ mean that $\angle 1 \cong \angle 4$ and $\angle 2 \cong \angle 3$, respectively, by the Alt. Int. $\angle$s Thm. It is given that $MR = NQ$, so $MR + RQ = NQ + RQ$, or $MQ = NR$, by the Add. Prop. of $=$. Therefore, $\triangle MQP \cong \triangle NRS$ by ASA.

Lesson 4-4

21. Given: $\overline{LO} \cong \overline{MN}$, $\overleftrightarrow{LO} \parallel \overleftrightarrow{MN}$

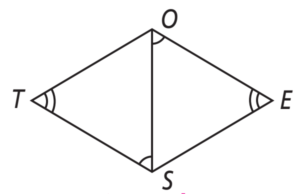
Prove: $\angle MLN \cong \angle ONL$



$\overleftrightarrow{OL} \parallel \overleftrightarrow{MN}$, so $\angle OLN \cong \angle MNL$. $\overline{LN} \cong \overline{LN}$ by the Reflexive Prop. of $\cong$. Since $\overline{LO} \cong \overline{MN}$, $\triangle MLN \cong \triangle ONL$ by SAS, and $\angle MLN \cong \angle ONL$ by CPCTC.

22. Given: $\angle OTS \cong \angle OES$, $\angle EOS \cong \angle OST$

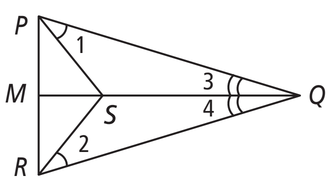
Prove: $\overline{TO} \cong \overline{ES}$



$\overline{OS} \cong \overline{OS}$ by the Reflexive Prop. of $\cong$. Since $\angle T \cong \angle E$ and $\angle TSO \cong \angle EOS$, $\triangle TSO \cong \triangle EOS$ by AAS, and $\overline{TO} \cong \overline{ES}$ by CPCTC.

23. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, M is the midpoint of $\overline{PR}$

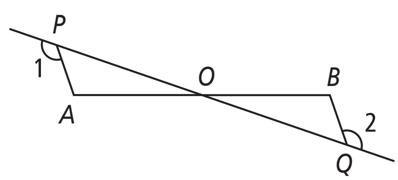
Prove: $\triangle PMQ \cong \triangle RMQ$



$\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$ (both given), and $\overline{SQ} \cong \overline{SQ}$ (Refl. Prop. of $\cong$) mean that $\triangle PQS \cong \triangle RQS$ by AAS, and $\overline{PQ} \cong \overline{RQ}$ by CPCTC. Point M is the midpoint of $\overline{PR}$, so $\overline{PM} \cong \overline{RM}$. Also, $\overline{QM} \cong \overline{QM}$ by the Refl. Prop. of $\cong$, so $\triangle PQM \cong \triangle RQM$ by SSS. $\angle PMQ \cong \angle RMQ$ by CPCTC.

24. Given: $PO = QO$, $\angle 1 \cong \angle 2$,

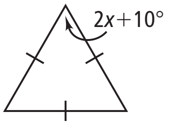
Prove: $\angle A \cong \angle B$



$\angle 1 \cong \angle 2$, so $\angle APO \cong \angle BQO$ because suppls. of $\cong$ $\angle$s are $\cong$. $PO = QO$ (Given) and $\angle AOP \cong \angle BOQ$ as vert. $\angle$s, so $\triangle AOP \cong \triangle BOQ$ by ASA. $\angle A \cong \angle B$ by CPCTC.

Lesson 4-5

Find the value of each variable.

25. 

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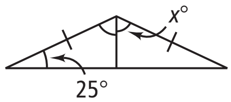
26. 

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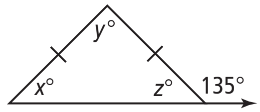
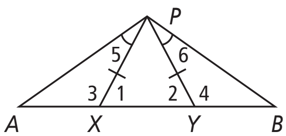
27. 

$x = 45$; $y = 90$; $z = 45$

28. Given: $\angle 5 \cong \angle 6$, $\overline{PX} \cong \overline{PY}$

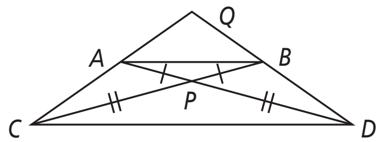
Prove: $\triangle PAB$ is isosceles.



$\overline{PX} \cong \overline{PY}$ (Given) means that $\angle 1 \cong \angle 2$ by the Isos. $\triangle$ Thm. $\angle 3 \cong \angle 4$ by the $\cong$ Suppls. Thm. $\angle 5 \cong \angle 6$ (Given), so $\triangle PXA \cong \triangle PYB$ by ASA. $\overline{PA} \cong \overline{PB}$ by CPCTC and $\triangle PAB$ is isos. by def. of isos.

29. Given: $\overline{AP} \cong \overline{BP}$, $\overline{PC} \cong \overline{PD}$

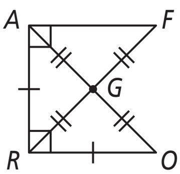
Prove: $\triangle QCD$ is isosceles.



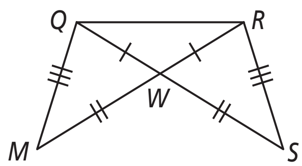
$\overline{AP} \cong \overline{BP}$ and $\overline{PC} \cong \overline{PD}$ (both given). $\angle APC \cong \angle BPD$ as vert. $\angle$s, so $\triangle APC \cong \triangle BPD$ by SAS. $\angle ACP \cong \angle BDP$ because CPCTC. $\angle PCD \cong \angle PDC$ by the Isos. $\triangle$ Thm. $m\angle ACP + m\angle PCD = m\angle BDP + m\angle PDC$ by the Add. Prop. of $=$, so $m\angle ACD = m\angle BDC$ by the $\angle$ Add. Post. and substitution. $\overline{QD} \cong \overline{QC}$ by the Conv. of the Isos. $\triangle$ Thm., and $\triangle QCD$ is isos. by def. of isos. $\triangle$.

Lessons 4-6 and 4-7

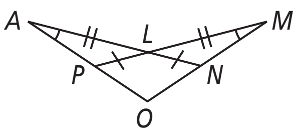
Name a pair of overlapping congruent triangles in each diagram. State whether the triangles are congruent by SSS, SAS, ASA, AAS, or HL.

30. 

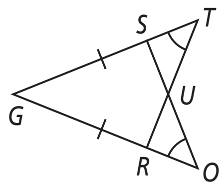
$\triangle ARO \cong \triangle RAF$; HL

31. 

$\triangle RQM \cong \triangle QRS$; SSS

32. 

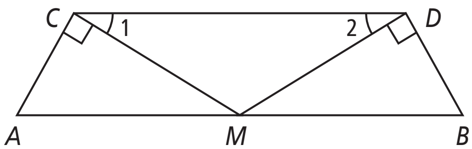
$\triangle AON \cong \triangle MOP$; AAS

33. 

$\triangle GRT \cong \triangle GSO$; ASA

34. Given: M is the midpoint of $\overline{AB}$, $\overline{MC} \perp \overline{AC}$, $\overline{MD} \perp \overline{BD}$, $\angle 1 \cong \angle 2$

Prove: $\triangle ACM \cong \triangle BDM$



$\angle 1 \cong \angle 2$ (Given), so $\overline{MC} \cong \overline{MD}$ by the Conv. of the Isos. $\triangle$ Thm. $\overline{AM} \cong \overline{BM}$ by the def. of midpt. $\overline{MC} \perp \overline{AC}$ means that $\angle ACM$ is a rt. $\angle$ and $\triangle ACM$ is a right $\triangle$. $\overline{MD} \perp \overline{BD}$ means that $\angle BDM$ is a rt. $\angle$ and $\triangle BDM$ is a right $\triangle$. $\triangle ACM \cong \triangle BDM$ by HL.

35. The longest leg of $\triangle ABC$, $\overline{AC}$, measures 10 centimeters. $\overline{BC}$ measures 8 centimeters. You measure two of the legs of $\triangle XYZ$ and find that $\overline{AC} \cong \overline{XZ}$ and $\overline{BC} \cong \overline{YZ}$. Can you conclude that two triangles to be congruent by the HL Theorem? Explain why or why not.

No; you only know that two sides (SS) are congruent, and you don't know that there are right angles.