Name ______________________ Date ______________ Class ______________

LESSON 5-1

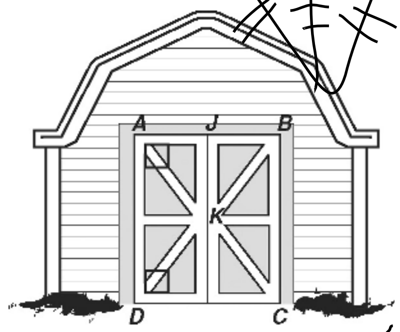
Problem Solving

Triangle Congruence: SSS and SAS

KEY

Use the diagram for Exercises 1 and 2.

A shed door appears to be divided into congruent right triangles.



1. Suppose $\overline{AB} \cong \overline{CD}$. Use SAS to show $\triangle ABD \cong \triangle DCA$.

S A S

1 $\overline{AB} \cong \overline{CD}$ Given

2 $\angle A \cong \angle D$ Given

3 $\overline{AD} \cong \overline{DA}$ Reflexive

4 $\triangle ABD \cong \triangle DCA$ SAS

2. J is the midpoint of AB and $\overline{AK} \cong \overline{BK}$. Use SSS to explain why $\triangle AKJ \cong \triangle BKJ$.

1 $AJ \cong BJ$ Defn midpoint

2 J is the midpt of AB Given

3 $\overline{AK} \cong \overline{BK}$ Given

4 $\overline{JK} \cong \overline{JK}$ Reflexive

5 SSS $\triangle AKJ \cong \triangle BKJ$

3. A *balalaika* is a Russian stringed instrument. Show that the triangular parts of the two balalaikas are congruent for $x = 6$.

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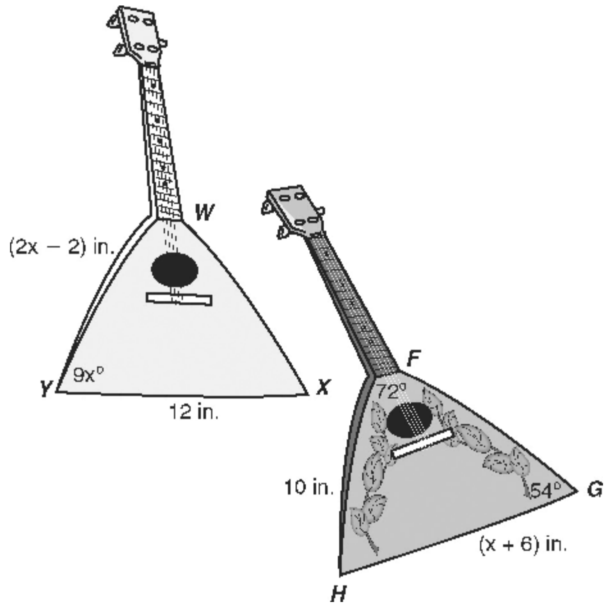
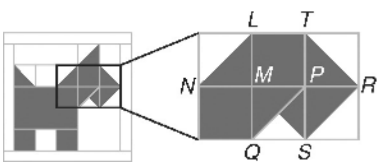


A quilt pattern of a dog is shown. Choose the best answer.



4. $ML = MP = MN = MQ = 1$ inch. Which statement is correct?
   - A $\triangle LMN \cong \triangle QMP$ by SAS.
   - B $\triangle LMN \cong \triangle QMP$ by SSS.
   - C $\triangle LMN \cong \triangle MQP$ by SAS.
   - D $\triangle LMN \cong \triangle MQP$ by SSS.

5. P is the midpoint of $\overline{TS}$ and $TR = SR = 1.4$ inches. What can you conclude about ΔTRP and ΔSRP?
   - F $\triangle TRP \cong \triangle SRP$ by SAS.
   - G $\triangle TRP \cong \triangle SRP$ by SSS.
   - H $\triangle TRP \cong \triangle SPR$ by SAS.
   - J $\triangle TRP \cong \triangle SPR$ by SSS.

2.

Statements	Reasons
1. $\overline{LK} \cong \overline{HJ}, \overline{GK} \cong \overline{GJ}$	1. Given
2. $LK = HJ$, $GK = GJ$	2. Def. of $\cong$ segments
3. $KJ = KJ$	3. Reflex. Prop. of =
4. $LK + KJ = HJ + KJ$	4. Add. Prop. of =
5. $LK + KJ = LJ$, $HJ + KJ = HK$	5. Seg. Add. Post.
6. $LJ = HK$	6. Subst.
7. $\overline{LJ} \cong \overline{HK}$	7. Def. of $\cong$ segments
8. $\angle GKL \cong \angle GJH$	8. Given
9. $\angle GKL$ and $\angle GKJ$ are supplementary; $\angle GJH$ and $\angle GJK$ are supplementary.	9. Linear Pair Thm.
10. $\angle GKJ \cong \angle GJK$	10. Congruent Supplements Thm.
11. $\triangle GLJ \cong \triangle GHK$	11. SAS (Steps 1, 7, 10)

Problem Solving

1. We know that $\overline{AB} \cong \overline{DC}$. $\angle ADC$ and $\angle DAB$ are right angles, so $\angle ADC \cong \angle DAB$ by Rt. $\angle \cong$ Thm. $\overline{AD} \cong \overline{DA}$ by Reflex. Prop. of $\cong$. So $\triangle ABD \cong \triangle DCA$ by SAS.
2. We know that $\overline{AK} \cong \overline{BK}$. Since J is the midpoint of $\overline{AB}$, $\overline{AJ} \cong \overline{BJ}$ by def. of midpoint. $\overline{JK} \cong \overline{JK}$ by Reflex. Prop. of $\cong$. So $\triangle AKJ \cong \triangle BKJ$ by SSS.
3. By the $\triangle$ Sum Thm., $m\angle H = 54°$. For $x = 6$, $WY = FH = 10$ in., $m\angle Y = m\angle H = 54°$, and $XY = HG = 12$ in. So $\triangle WXY \cong \triangle FHG$ by SAS.
4. A
5. G

Reading Strategies

1. Both involve the sides of the two triangles being compared.
2. Postulate SAS involves comparing included angles within the triangles, while SSS compares only the sides.
3. Postulates and theorems are both statements that can be used to compare geometric shapes.
4. Postulates are accepted as being true without proof, while a theorem has been proven.
5. SSS
6. SAS
7. neither
8. SAS

5-2 TRIANGLE CONGRUENCE: ASA, AAS, AND HL

Practice A

1. $\overline{XZ}$
2. $\overline{YX}$
3. $\overline{YZ}$
4. HL
5. AAS
6. ASA
7. No; you need to know that $\overline{AC} \cong \overline{DF}$.
8. Yes, if you use Third $\angle$s Thm. first.
9. Yes
10.

Statements	Reasons
1. $\angle IJK \cong \angle LMN$, $\angle IKJ \cong \angle LNM$	1. a. Given
2. $\overline{JK} \cong \overline{MN}$	2. b. Definition of rectangle
3. $\triangle IJK \cong \triangle LMN$	3. c. ASA

Practice B

1. No; you need to know that $\overline{AB} \cong \overline{CB}$.
2. Yes
3. Yes, if you use Third $\angle$s Thm. first.
4. HL
5. ASA or AAS
6. none
7. AAS or ASA
8. Possible answer: All right angles are congruent, so $\angle QUR \cong \angle SUR$. $\angle RQU$ and $\angle PQU$ are supplementary and $\angle RSU$ and $\angle TSU$ are supplementary by the Linear Pair Theorem. But it is given that $\angle PQU \cong \angle TSU$, so by the Congruent Supplements Theorem, $\angle RQU \cong \angle RSU$. $\overline{RU} \cong \overline{RU}$ by the Reflexive Property of $\cong$, so $\triangle RUQ \cong \triangle RUS$ by AAS.