Name ____________________ Date ____________

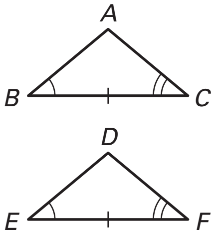
LESSON 4.5

Practice A

For use with pages 259–265

Is it possible to prove that the triangles are congruent? If so, state the postulate or theorem you would use.

1.



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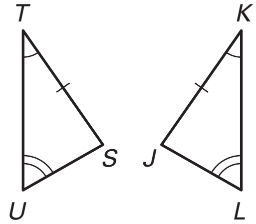

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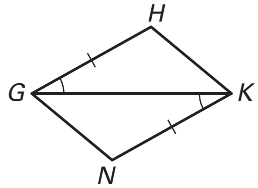
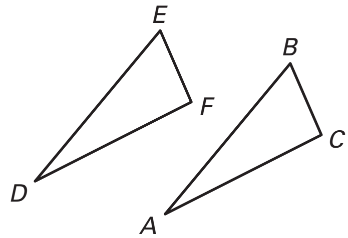


State the third congruence that is needed to prove that $\triangle DEF \cong \triangle ABC$ using the given postulate or theorem.

4. **GIVEN:** $\overline{DE} \cong \overline{AB}$, $\angle D \cong \angle A$, __?__ $\cong$ __?__
Use the AAS Congruence Theorem.

5. **GIVEN:** $\overline{FE} \cong \overline{CB}$, $\angle F \cong \angle C$, __?__ $\cong$ __?__
Use the ASA Congruence Postulate.

6. **GIVEN:** $\overline{DF} \cong \overline{AC}$, $\angle F \cong \angle C$, __?__ $\cong$ __?__
Use the SAS Congruence Postulate.

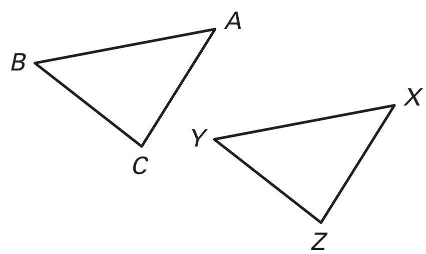


State the third congruence that is needed to prove that $\triangle ABC \cong \triangle XYZ$ using the given postulate or theorem.

7. **GIVEN:** $\angle C \cong \angle Z$, $\overline{AC} \cong \overline{XZ}$, __?__ $\cong$ __?__
Use the AAS Congruence Theorem.

8. **GIVEN:** $\angle B \cong \angle Y$, $\overline{AB} \cong \overline{XY}$, __?__ $\cong$ __?__
Use the ASA Congruence Postulate.

9. **GIVEN:** $\overline{BC} \cong \overline{YZ}$, $\angle B \cong \angle Y$, __?__ $\cong$ __?__
Use the SAS Congruence Postulate.



Tell whether you can use the given information to determine whether $\triangle JKL \cong \triangle RST$.

10. $\angle J \cong \angle R$, $\angle K \cong \angle S$, $\angle L \cong \angle T$

11. $\overline{JK} \cong \overline{RS}$, $\angle J \cong \angle R$, $\angle L \cong \angle T$

12. $\angle K \cong \angle S$, $\angle L \cong \angle T$, $\overline{KL} \cong \overline{ST}$

13. $\angle J \cong \angle R$, $\overline{KL} \cong \overline{ST}$

Name ______________________ Date ______________

LESSON 4.5

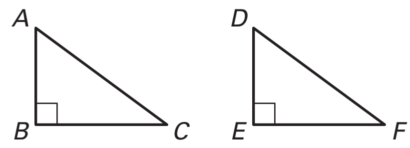
Practice A *continued*

For use with pages 259–265

14. Multiple Choice Which postulate or theorem can you use to prove that $\triangle ABC \cong \triangle DEF$?

A. AAS **B.** ASA

C. SAS **D.** Not enough information

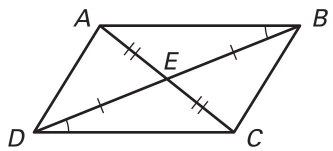


***Explain* how you can prove that the indicated triangles are congruent using the given postulate or theorem.**

15. $\triangle ABE \cong \triangle CDE$ by SAS

16. $\triangle ABE \cong \triangle CDE$ by ASA

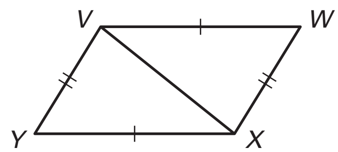
17. $\triangle ABE \cong \triangle CDE$ by AAS



18. Proof Complete the proof.

GIVEN: $\overline{VW} \cong \overline{XY}$, $\overline{WX} \cong \overline{YV}$

PROVE: $\triangle WXV \cong \triangle YVX$

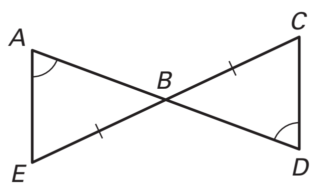


Statements	Reasons
1. $\overline{VW} \cong \overline{XY}$	**1.** ___?___
2. $\overline{WX} \cong \overline{YV}$	**2.** ___?___
3. $\overline{VX} \cong \overline{VX}$	**3.** ___?___
4. $\triangle WXV \cong \triangle YVX$	**4.** ___?___

19. Proof Write a proof.

GIVEN: $\overline{BE} \cong \overline{BC}$, $\angle A \cong \angle D$

PROVE: $\triangle ABE \cong \triangle DBC$



2.

Statements	Reasons
1. $\overline{DC} \cong \overline{AF}$, $\overline{ED} \cong \overline{BA}$	1. Given
2. $\overline{FD} \perp \overline{DE}$, $\overline{CA} \perp \overline{AB}$	2. Given
3. $\angle EDF$ and $\angle BAC$ are right angles.	3. Definition of $\perp$ lines
4. $\angle EDF \cong \angle BAC$	4. Right Angles Congruence Theorem
5. $DF = DC + CF$, $CA = CF + FA$	5. Segment Addition Postulate
6. $DC = AF$	6. Definition of congruent segments
7. $DF = FA + CF$	7. Substitution property of equality
8. $DF = CA$	8. Substitution property of equality
9. $\overline{DF} \cong \overline{CA}$	9. Definition of congruent segments
10. $\triangle ABC \cong \triangle DEF$	10. SAS Congruence Postulate

3.

Statements	Reasons
1. $DE = BF$, $AE = CF$	1. Given
2. $\overline{AE} \perp \overline{DB}$, $\overline{CF} \perp \overline{BD}$	2. Given
3. $\angle AEB$ and $\angle CFD$ are right angles.	3. Definition of $\perp$ lines
4. $\angle AEB \cong \angle CFD$	4. Right Angles Congruence Theorem
5. $BE = BF + FE$, $FD = FE + ED$	5. Segment Addition Postulate
6. $FD = FE + BF$	6. Substitution property of equality
7. $FD = BE$	7. Substitution property of equality
8. $\overline{AE} \cong \overline{CF}$, $\overline{FD} \cong \overline{BE}$	8. Definition of congruent segments
9. $\triangle AEB \cong \triangle CFD$	9. SAS Congruence Postulate

4.

Statements	Reasons
1. $\overline{QR} \cong \overline{ST}$, $\overline{QU} \cong \overline{SV}$	1. Given
2. $\overline{RS} \parallel \overline{QT}$, $\overline{QR} \parallel \overline{TS}$	2. Given
3. $\angle RQU \cong \angle UST$	3. Alternate Interior Angles Theorem
4. $QU = SV$	4. Definition of congruent segments
5. $QV = QU + UV$, $US = UV + VS$	5. Segment Addition Postulate
6. $QV = SV + UV$	6. Substitution property of equality
7. $QV = US$	7. Substitution property of equality
8. $\overline{QV} \cong \overline{US}$	8. Definition of congruent segments
9. $\triangle QRV \cong \triangle STU$	9. SAS Congruence Postulate

5. You are given that $\overline{PS} \cong \overline{RQ}$. In the diagram, you can see that $\overline{PS} \parallel \overline{QR}$. Therefore, by the Alternate Interior Angles Theorem, you can conclude that $\angle RQS \cong \angle PSQ$. By the reflexive property of congruence, $\overline{SQ} \cong \overline{SQ}$. You can now conclude that $\triangle PSQ \cong \triangle RQS$ by the SAS Congruence Postulate.

In the diagram, you can see that $\angle STV$ and $\angle QUV$ are right angles. By the definition of a right triangle, you can conclude that $\triangle STV$ and $\triangle QUV$ are right triangles. You are given that $\overline{SV} \cong \overline{QV}$ and $\overline{ST} \cong \overline{QU}$. Therefore, you can conclude that $\triangle STV \cong \triangle QUV$ by the HL Congruence Theorem. Because $\triangle STV \cong \triangle QUV$, you know that $\overline{TV} \cong \overline{VU}$. So, you can conclude that V is the midpoint of $\overline{TU}$ by the definition of the midpoint of a segment.

6. $X(4, 10)$, $Y(15, 3)$

Lesson 4.5

Practice Level A

1. Yes, ASA Congruence Postulate

2. Yes, AAS Congruence Theorem

3. Yes, SAS Congruence Postulate

4. $\angle F \cong \angle C$ **5.** $\angle E \cong \angle B$ **6.** $\overline{FE} \cong \overline{CB}$

7. $\angle B \cong \angle Y$ **8.** $\angle A \cong \angle X$ **9.** $\overline{AB} \cong \overline{XY}$

10. no **11.** yes **12.** yes **13.** no **14.** D

15. Two pairs of corresponding sides ($\overline{AE} \cong \overline{CE}$, $\overline{BE} \cong \overline{DE}$) and the corresponding included angles ($\angle BEA \cong \angle DEC$) are congruent.

ANSWERS

16. Two pairs of corresponding angles ($\angle ABE \cong \angle CDE$, $\angle BEA \cong \angle DEC$) and the corresponding included sides ($\overline{BE} \cong \overline{DE}$) are congruent. **17.** Two pairs of corresponding angles ($\angle ABE \cong \angle CDE$, $\angle BEA \cong \angle DEC$) and the corresponding non-included sides ($\overline{AE} \cong \overline{CE}$) are congruent. **18. 1.** Given; **2.** Given; **3.** Reflexive Property of Congruence; **4.** SSS Congruence Postulate

19. It is given that $\overline{BE} \cong \overline{BC}$ and $\angle A \cong \angle D$. By the Vertical Angles Theorem, $\angle ABE \cong \angle DBC$. $\triangle ABE \cong \triangle DBC$ by the AAS Congruence Theorem.

Practice Level B

1. $\overline{DF} \cong \overline{MO}$ **2.** $\angle D \cong \angle M$ **3.** $\angle D \cong \angle M$
4. $\overline{BC} \cong \overline{YZ}$ or $\overline{AC} \cong \overline{XZ}$ **5.** $\angle B \cong \angle Y$

6. $\angle A \cong \angle X$ **7.** No **8.** Yes, AAS Congruence Theorem; use $\angle TSN \cong \angle USH$ by Vertical Angles Theorem

9. Yes, AAS Congruence Theorem

10. Yes, AAS Congruence Theorem

11. Yes, SAS Congruence Postulate

12. No; three pairs of congruent angles is insufficient to prove triangle congruence.

13. No; two angles and a non-included side are congruent, but the non-included sides are not corresponding parts. **14.** Two pairs of corresponding sides ($\overline{BF} \cong \overline{BD}$, $\overline{EF} \cong \overline{ED}$) and the corresponding included angles ($\angle BFE \cong \angle BDE$) are congruent.

15. Two pairs of corresponding angles ($\angle ADB \cong \angle CFB$, $\angle BAD \cong \angle BCF$) and the corresponding included sides ($\overline{AD} \cong \overline{CF}$) are congruent. **16.** Two pairs of corresponding angles ($\angle ABF \cong \angle CBD$, $\angle BAF \cong \angle BCD$) and the corresponding non-included sides ($\overline{AF} \cong \overline{CD}$) are congruent. **17. 1.** Given; **2.** Corresponding Angles Postulate; **3.** Given; **4.** Corresponding Angles Postulate; **5.** Given; **6.** ASA Congruence Postulate

18. It is given that $\angle B \cong \angle D$ and that $\overline{AC} \cong \overline{EC}$. By the Vertical Angles Theorem, $\angle BCA \cong \angle DCE$. $\triangle ABC \cong \triangle EDC$ by the AAS Congruence Theorem.

Practice Level C

1. $\overline{FE} \cong \overline{TR}$ or $\overline{DE} \cong \overline{QR}$ **2.** $\angle F \cong \angle T$
3. $\overline{DF} \cong \overline{QT}$ **4.** No **5.** Yes; $\angle KNL \cong \angle MLN$ by Alternate Interior Angles Theorem, $\overline{LN} \cong \overline{LN}$ by Reflexive Property of Congruence, $\triangle KLN \cong \triangle MNL$ by ASA Congruence Postulate

6. Yes; $\overline{TX} \cong \overline{VY}$ by summation of congruent parts, $\overline{YX} \cong \overline{YX}$ by Reflexive Property of Congruence, $\overline{XZ} \cong \overline{YW}$ by summation of congruent parts, $\triangle TXZ \cong \triangle VYW$ by SAS Congruence Theorem **7.** No, $\angle M$ and $\angle Y$ are not corresponding angles. **8.** No, $\overline{JR}$ and $\overline{YZ}$ are not corresponding sides. **9.** Yes, AAS Congruence Theorem **10.** No, the congruent sides are not corresponding sides. **11.** Two pairs of corresponding sides ($\overline{AF} \cong \overline{BF}$, $\overline{FD} \cong \overline{FC}$) and the corresponding included angles ($\angle AFD \cong \angle BFC$, by Vertical Angles Theorem) are congruent. **12.** Two pairs of corresponding angles ($\angle ACE \cong \angle DBA$, $\angle AEC \cong \angle DAB$) and the a corresponding non-included side ($\overline{AC} \cong \overline{DB}$, by summation of congruent parts) are congruent.

13. $\angle ACD \cong \angle ABD$ is given. $\angle BDC \cong \angle ABD$ by Alternate Interior Angles Theorem. $\angle ACD \cong \angle BDC$ by Transitive Property of Congruence. $\overline{DC} \cong \overline{DC}$ by Reflexive Property of Congruence. $\angle ADF \cong \angle BCF$ because $\triangle ADF \cong \triangle BCF$ by SAS Congruence Theorem. Then $\angle ADC \cong \angle BCD$ by summation of congruent parts.

14.

Statements	Reasons
1. $\overline{AB} \parallel \overline{DC}$	**1.** Given
2. $\angle ADB \cong \angle CBD$	**2.** Given
3. $\angle ABD \cong \angle CDB$	**3.** Alternate Interior Angles Theorem
4. $\overline{DB} \cong \overline{DB}$	**4.** Reflexive Property of Congruence
5. $\triangle ABD \cong \triangle CDB$	**5.** ASA Congruence Postulate

15. 1. Given; **2.** Given; **3.** Reflexive Property of Congruence; **4.** AAS Congruence Theorem; **5.** Corresponding parts of congruent triangles are congruent; **6.** Alternate Interior Angles Converse

16. 1. Given; **2.** Given; **3.** Vertical Angles Theorem; **4.** ASA Congruence Postulate; **5.** Corresponding parts of congruent triangles are congruent.