### **4-5** Triangle Congruence by SSS and SAS

- 1. to apply the SSS and SAS postulates in problem solving
- to prove two triangles congruent using the SSS and SAS Postulates

### **OBJECTIVES**

### **KEY CONCEPT**

If the three sides of one triangle are congruent to the three sides of another triangle, then the two triangles are congruent.



### **KEY CONCEPT**

If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the two triangles are congruent.



Draw  $\triangle MGT$ . Use the triangle to answer the questions.



**1.** What angle is included between  $\overline{GM}$  and  $\overline{MT}$ ?

LM

**2.** Which sides include  $\angle T$ ?

GT and MT

**3.** What angle is included between  $\overline{GT}$  and  $\overline{MG}$ ?

LG

Would you use SSS or SAS to prove the triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write not enough information. Explain your answer.



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not enough info.

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8.

Would you use SSS or SAS to prove the triangles congruent? If there is not enough information to prove the triangles congruent by SSS or SAS, write not enough information. Explain your answer.



9. A student draws  $\triangle ABC$  and  $\triangle QRS$ . The following sides and angles are congruent:

 $\overline{AC} \cong \overline{QS}, \ \angle B \cong \angle R, \ \overline{AB} \cong \overline{QR}$ 

B

Based on this, can the student use either SSS or SAS to prove that  $\triangle ABC \cong \triangle QRS?$ 

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**10. Given:**  $\overline{BC} \cong \overline{DC}, \overline{AC} \cong \overline{EC}$ **Prove:**  $\triangle ABC \cong \triangle EDC$ 



**Statements** 



1.  $\overline{BC} \cong \overline{DC}, \overline{AC} \cong \overline{EC}$ 2.  $\angle BCA \cong \angle DCE$ 2.  $\triangle ABC = \triangle DCE$ 

3.  $\triangle ABC \cong \triangle EDC$ 

- 1. Given
- 2. Vertical angles are congruent
- 3. SAS Postulate

**11. Given:**  $\overline{WX} \parallel \overline{YZ}, \overline{WX} \cong \overline{YZ}$ **Prove:**  $\Delta WXZ \cong \Delta YZX$ 



Statements

#### Reasons

1.	$\overline{WX} \parallel \overline{YZ}, \overline{WX} \cong \overline{YZ}$
2.	$\angle WXZ \cong \angle YZX$
З.	$\overline{ZX} \cong \overline{ZX}$
4.	$\Delta WXZ \cong \Delta YZX$

1. Given

2. Alternate interior angles theorem

- 3. Reflexive property of  $\cong$
- 4. SAS Postulate

### **EXIT PROBLEM**

**Given:**  $\overline{BD}$  is the perpendicular bisector of  $\overline{AC}$ .

**Prove:**  $\triangle BAD \cong \triangle BCD$ 

Statements	Reasons

А

R

### **EXIT PROBLEM**

**Given:**  $\overline{BD}$  is the perpendicular bisector of  $\overline{AC}$ .

**Prove:**  $\triangle BAD \cong \triangle BCD$ 



Statements	Reasons
1) $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$	1) Given
2) $\overline{AD} \cong \overline{CD}$	2) Definition of bisector
3) $\angle ADB$ and $\angle CDB$ are right angles.	3) Definition of ⊥
$4) \angle ADB \cong \angle CDB$	4) All right angles are congruent.
5) $\overline{DB} \cong \overline{DB}$	5) Reflexive property of $\cong$
6) $\Delta BAD \cong \Delta BCD$	6) SAS Postulate

Two prove triangles congruent yo can have:

- 1. Three sides (SSS)
- 2. Two sides and the included angle (SAS)

### SUMMARY

## LEARNING RUBRIC

- Got It: Proves congruent triangles using proofs with complex diagrams/less direct congruence given
- Almost There: Proves congruent triangles using proofs with simple diagrams/mostly direct congruence given
- Moving Forward: Informally identifies the reason for congruent triangles
- Getting Started: Identifies included angles

### HOMEWORK

Pages 254 - 256 8 - 20 even; 21, 28, 30

### ANSWER SLIDE

- *1)* ∠*M*
- 2)  $\overline{MT}$  and  $\overline{GT}$
- *3)* ∠G
- 4) SAS Postulate;  $\Delta PEF \cong \Delta REF$
- 5) not enough information
- 6) SSS Postulate;  $\Delta PAN \cong \Delta KLC$
- 7) not enough information
- 8) SAS Postulate;  $\Delta PTF \cong \Delta GTS$
- 9) No
- 10) See slides for proofs