Geometry - Chapter 4 Midterm Study Guide

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. Which congruence statement does NOT necessarily describe the triangles shown if \( \triangle DEF \cong \triangle FGH \)?

   a. \( \triangle EDF \cong \triangle GFH \)
   b. \( \triangle FDE \cong \triangle FGH \)
   c. \( \triangle EFD \cong \triangle GHF \)
   d. \( \triangle FED \cong \triangle HGF \)

2. Use the information given in the diagram. Tell why \( MN \cong PO \) and \( \angle NOM \cong \angle PMO \).

   a. Transitive Property, Reflexive Property
   b. Given, Given
   c. Reflexive Property, Transitive Property
   d. Given, Reflexive Property

3. Name the angle included by the sides \( PN \) and \( NM \).

   a. \( \angle N \)
   b. \( \angle P \)
   c. \( \angle M \)
   d. none of these
4. Which two triangles are congruent by ASA?
   \( AF \) bisects \( EC \), and \( \angle AED \equiv \angle FCD \).

   ![Triangle Diagram]

   a. \( \triangle ABD \) and \( \triangle CBD \)  
   b. \( \triangle ADE \) and \( \triangle FDC \)
   c. \( \triangle AED \) and \( \triangle ADB \)  
   d. none

5. Which pair of triangles is congruent by ASA?

   ![Triangle Diagrams]

   a. none  
   b. none
   c. none  
   d. none

6. \( R, S, \) and \( T \) are the vertices of one triangle. \( E, F, \) and \( D \) are the vertices of another triangle. \( m \angle R = 60 \), \( m \angle S = 80 \), \( m \angle F = 60 \), \( m \angle D = 40 \), \( RS = 4 \), and \( EF = 4 \). Are the two triangles congruent? If yes, explain and tell which segment is congruent to \( RT \).

   a. yes, by ASA; \( FD \)
   b. yes, by AAS; \( ED \)
   c. yes, by SAS; \( ED \)
   d. No, the two triangles are not congruent.
7. Supply the missing reasons to complete the proof.

**Given:** \(\angle Q \cong \angle T\) and \(\overline{QR} \cong \overline{TR}\)

**Prove:** \(PR \cong SR\)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (\angle Q \cong \angle T) and (\overline{QR} \cong \overline{TR})</td>
<td>1. Given (\triangle)</td>
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<tr>
<td>2. (\angle PRQ \cong \angle SRT)</td>
<td>2. Vertical angles are congruent. (\triangle)</td>
</tr>
<tr>
<td>3. (\triangle PRQ \cong \triangle SRT)</td>
<td>3. ? (\triangle)</td>
</tr>
<tr>
<td>4. (PR \cong SR)</td>
<td>4. ? (\triangle)</td>
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</tbody>
</table>

a. ASA; Substitution  
b. SAS; Corresp. parts of \(\cong \triangle\) are \(\cong\)  
c. AAS; Corresp. parts of \(\cong \triangle\) are \(\cong\)  
d. ASA; Corresp. parts of \(\cong \triangle\) are \(\cong\)

8. What is the value of \(x\)?

a. 86.5°  
b. 43.25°  
c. 133.25°  
d. 46.75°

9. In an A-frame house, the two congruent sides extend from the ground to form a 34° angle at the peak. What angle does each side form with the ground?

a. 156  
b. 146  
c. 73  
d. 78
10. For which situation could you immediately prove $\triangle 1 \cong \triangle 2$ using the HL Theorem?

- a. I only
- b. II only
- c. III only
- d. II and III

11. What common side do $\triangle DHB$ and $\triangle DEB$ share?

- a. $BD$
- b. $DH$
- c. $EB$
- d. $HB$

12. $BE$ is the bisector of $\angle ABC$ and $CD$ is the bisector of $\angle ACB$. Also, $\angle XBA \cong \angle YCA$. Which of AAS, SSS, SAS, or ASA would you use to help you prove $\overline{BL} \cong \overline{CM}$?

- a. AAS
- b. SSS
- c. SAS
- d. ASA
13. Which overlapping triangles are congruent by ASA?

![Diagram of overlapping triangles]

a. $\triangle ADC \cong \triangle EBC$

b. $\triangle ABE \cong \triangle CDA$

c. $\triangle ABE \cong \triangle DEA$

d. $\triangle ADC \cong \triangle EDA$

Short Answer

14. If $\triangle PQR \cong \triangle TSR$, what are the congruent corresponding parts?

![Diagram of congruent triangles]

15. Is there enough information to prove the two triangles congruent? If yes, write the congruence statement and name the postulate you would use. If no, write not possible and tell what other information you would need.

16. For $\triangle RST$ and $\triangle UVW$, $\angle R \cong \angle U$, $\overline{ST} \cong \overline{WV}$, and $\angle S \cong \angle V$. Explain how you can prove $\triangle RST \cong \triangle UVW$ by ASA.
17. Complete the statement $BF \cong \underline{\hspace{2cm}}$. Explain why it is true.

18. Fill in the missing reasons to complete the proof.
   Given: $\angle VUY \cong \angle UWT \cong \angle X$
   Prove: $UW \cong UT$

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<tr>
<td>1. $\angle VUY \cong \angle X$</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. $UW \parallel XY$</td>
<td>2. Converse of the Corresponding Angles Postulate</td>
</tr>
<tr>
<td>3. $\angle T \cong \angle VUY$</td>
<td>3. ?</td>
</tr>
<tr>
<td>4. $\angle VUY \cong \angle UWT$</td>
<td>4. Given</td>
</tr>
<tr>
<td>5. $\angle T \cong \angle UWT$</td>
<td>5. Transitive Property</td>
</tr>
<tr>
<td>6. $UT \cong UW$</td>
<td>6. ?</td>
</tr>
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19. Is $\triangle PQS \cong \triangle RQS$ by HL? If so, name the legs that allow the use of HL.
20. Write the missing reasons to complete the flow proof.

**Given:** \( \angle ADB \) and \( \angle CDB \) are right angles, \( \angle A \cong \angle C \)

**Prove:** \( \triangle ADB \cong \triangle CDB \)

\[ \begin{array}{c}
\triangle ADB \text{ and } \triangle CDB \\
\text{are right } \triangle.
\end{array} \]

\[ \begin{array}{c}
\triangle ADB \cong \triangle CDB \\
\text{are right } \triangle.
\end{array} \]

Given

\[ \angle A \cong \angle C \]

Given

\[ \begin{array}{c}
\overline{BA} \cong \overline{BC} \\
d.
\end{array} \]

\[ \begin{array}{c}
\overline{DB} \cong \overline{DB} \\
c.
\end{array} \]

\[ \begin{array}{c}
a.
\end{array} \]
21. Complete the proof by providing the missing reasons.

**Given:** $CB \perp BD$, $DE \perp EC$, $CB = DE$

**Prove:** $\triangle DBC \cong \triangle CED$

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<tr>
<td>1. $CB = DE$, $CB \perp BD$, and $DE \perp EC$</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. $\angle CBD$ and $\angle DEC$ are right angles</td>
<td>2. Definition of perpendicular segments</td>
</tr>
<tr>
<td>3. $\angle CBD \cong \angle DEC$</td>
<td>3. ?</td>
</tr>
<tr>
<td>4. $CD \cong CD$</td>
<td>4. ?</td>
</tr>
<tr>
<td>5. $\triangle DBC \cong \triangle CED$</td>
<td>5. ?</td>
</tr>
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</table>

22. Separate and redraw $\triangle ABC$ and $\triangle CDA$. Identify any common angles or sides.
Essay

23. Write a proof.

**Given:** $BC \cong DA$, $\angle 1 \cong \angle 2$, and $CF \cong AF$

**Prove:** $\triangle CFE \cong \triangle AFE$

Other

24. When you open a stepladder, you use a brace on each side of the ladder to lock the legs in place. Explain why the triangles formed on each side by the legs and the ground ($\triangle ABC$ and $\triangle DEF$ in the diagram) are congruent.