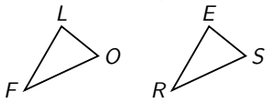
Inequalities in Two Triangles

Hinge Theorem (SAS Inequality Theorem): If two sides of one triangle are congruent to two sides of a second triangle and the included angle of the first is larger than the included angle of the second, then the third side of the first triangle is longer than the third side of the second triangle.

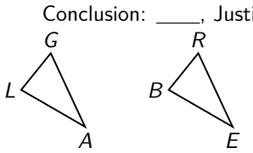
Converse of Hinge Theorem (SSS inequality Theorem): If two sides of one triangle are congruent to two sides of a second triangle and the third side of the first is longer than the third side of the second, then the included angle of the first triangle is larger than the included angle of the second triangle.

Practice Exercises

Given the facts about the two triangles, what conclusion can you make? Write the justification of your conclusion.



1. $\overline{FL} \cong \overline{RE}$, $\overline{LO} \cong \overline{ES}$, $m\angle L > m\angle E$
   Conclusion: ____, Justification: ____
2. $\overline{RS} \cong \overline{FO}$, $\overline{RE} \cong \overline{FL}$, $\overline{ES} < \overline{LO}$
   Conclusion: ____, Justification: ____
3. $\overline{OL} \cong \overline{SE}$, $\overline{OF} \cong \overline{SR}$, $\overline{LF} > \overline{ER}$
   Conclusion: ____, Justification: ____
4. $\overline{FO} \cong \overline{RS}$, $\overline{LO} \cong \overline{ES}$, $m\angle O > m\angle S$
   Conclusion: ____, Justification: ____
5. $\overline{FL} \cong \overline{RE}$, $\overline{LO} \cong \overline{ES}$, $\overline{FO} < \overline{RS}$
   Conclusion: ____, Justification: ____



6. $\overline{GL} \cong \overline{BR}$, $\overline{AL} \cong \overline{BE}$, $m\angle L > m\angle B$
   Conclusion: ____, Justification: ____
7. $\overline{AG} \cong \overline{ER}$, $\overline{AL} \cong \overline{BE}$, $\overline{GL} < \overline{BR}$
   Conclusion: ____, Justification: ____
8. $\overline{AG} \cong \overline{ER}$, $\overline{GL} \cong \overline{BR}$, $\overline{AL} > \overline{BE}$
   Conclusion: ____, Justification: ____
9. $\overline{AL} \cong \overline{BE}$, $\overline{AG} \cong \overline{ER}$, $m\angle A > m\angle E$
   Conclusion: ____, Justification: ____
10. $\overline{AL} \cong \overline{BE}$, $\overline{GL} \cong \overline{BR}$, $\overline{AG} < \overline{ER}$
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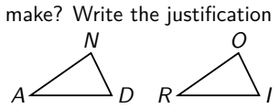

1. $\overline{AN} \cong \overline{RO}$, $\overline{ND} \cong \overline{OI}$, $m\angle N > m\angle O$
   Conclusion: ____, Justification: ____
2. $\overline{RI} \cong \overline{AD}$, $\overline{RO} \cong \overline{AN}$, $\overline{OI} < \overline{ND}$
   Conclusion: ____, Justification: ____
3. $\overline{ND} \cong \overline{OI}$, $\overline{AD} \cong \overline{RI}$, $\overline{AN} > \overline{RO}$
   Conclusion: ____, Justification: ____
4. $\overline{AD} \cong \overline{RI}$, $\overline{ND} \cong \overline{OI}$, $m\angle D > m\angle I$
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5. $\overline{AN} \cong \overline{RO}$, $\overline{ND} \cong \overline{OI}$, $\overline{AD} < \overline{RI}$
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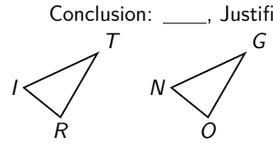

6. $\overline{TI} \cong \overline{GN}$, $\overline{IR} \cong \overline{NO}$, $m\angle I > m\angle N$
   Conclusion: ____, Justification: ____
7. $\overline{RI} \cong \overline{NO}$, $\overline{TR} \cong \overline{GO}$, $\overline{IT} < \overline{GN}$
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9. $\overline{TR} \cong \overline{GO}$, $\overline{TI} \cong \overline{GN}$, $m\angle T > m\angle G$
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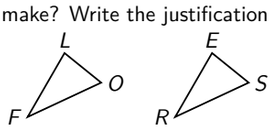

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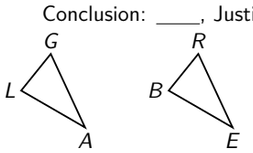

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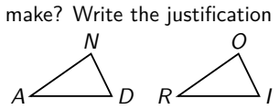

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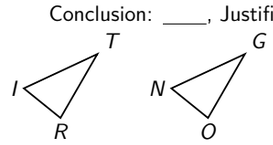

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