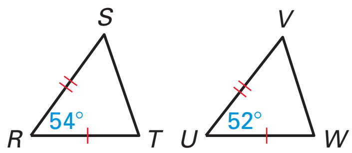
LESSON 5.6 Exercise Set A

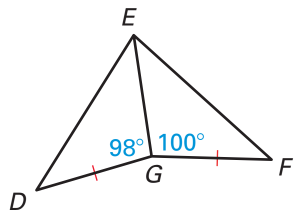
MM1G2a Use conjecture, inductive reasoning, deductive reasoning, counterexamples, and indirect proof as appropriate.

Copy and complete the statement with <, >, or =. *Explain.*

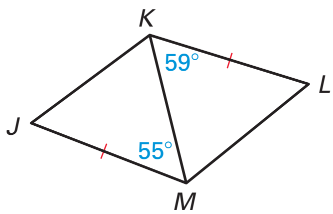
1. ST __?__ VW



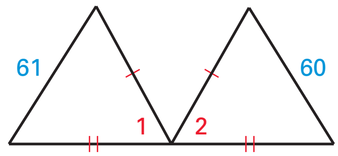
2. DE __?__ EF



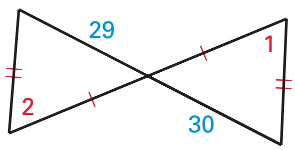
3. JK __?__ LM



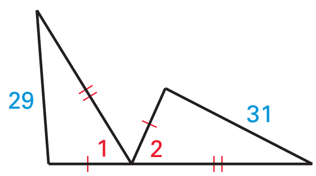
4. $m\angle 1$ __?__ $m\angle 2$



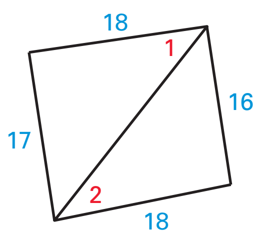
5. $m\angle 1$ __?__ $m\angle 2$



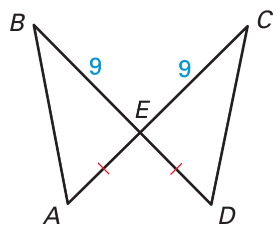
6. $m\angle 1$ __?__ $m\angle 2$



7. $m\angle 1$ __?__ $m\angle 2$

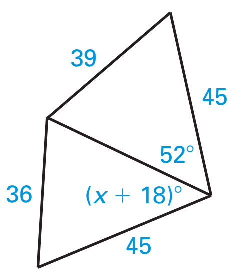


8. AB __?__ CD

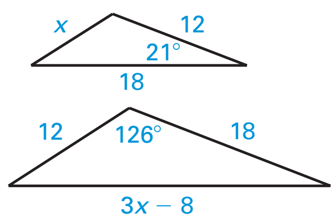


Use the Hinge Theorem or its converse and properties of triangles to write and solve an inequality to describe a restriction on the value of *x*.

9.



10.



Exercise Set A *(continued)*

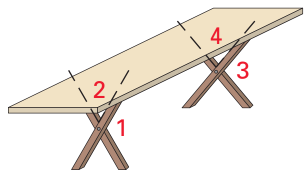
Write a temporary assumption you could make to prove the conclusion indirectly.

11. If two lines in a plane are parallel, then the two lines do not contain two sides of a triangle.

12. In $\triangle ABC$, if $m\angle A > 90°$, then $m\angle B < 90°$.

13. If x and y are even integers, then xy is even.

14. **Multiple Representations** All four legs of the table shown have identical measurements, but they are attached to the table top so that $\angle 3$ is smaller than $\angle 1$.



a. **Using a Theorem** Use the Hinge Theorem to explain why the table top is not level.

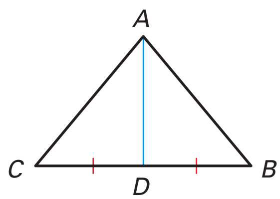
b. **Using the Converse of a Theorem** Use the Converse of the Hinge Theorem to explain how to use a length measure to determine when $\angle 4 \cong \angle 2$ in reattaching the rear pair of legs to make the table level.

15. **Fishing Contest** One contestant in a catch-and-release fishing contest spends the morning at a location 1.8 miles due north of the starting point, then goes 1.2 miles due east for the rest of the day. A second contestant starts out 1.2 miles due east of the starting point, then goes another 1.8 miles in a direction 84° south of due east to spend the rest of the day. Which angler is farther from the starting point at the end of the day? *Explain* how you know.

16. **Indirect Proof** Arrange statements A–F in order to write an indirect proof of Case 1.

GIVEN: $\overline{AD}$ is a median of $\triangle ABC$.
$\angle ADB \cong \angle ADC$

PROVE: $AB = AC$



Case 1:

A. Then $m\angle ADB < m\angle ADC$ by the converse of the Hinge Theorem.

B. Then $\overline{BD} \cong \overline{CD}$ by the definition of midpoint. Also, $\overline{AD} \cong \overline{AD}$ by the reflexive property.

C. This contradiction shows that the temporary assumption that $AB < AC$ is false.

D. But this contradicts the given statement that $\angle ADB \cong \angle ADC$.

E. Because $\overline{AD}$ is a median of $\triangle ABC$, D is the midpoint of $\overline{BC}$.

F. Temporarily assume that $AB < AC$.

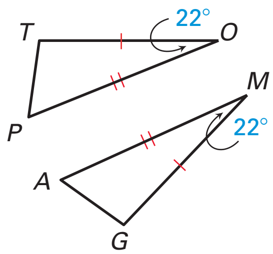
17. **Indirect Proof** There are two cases to consider for the proof in Exercise 16. Write an indirect proof for Case 2, temporarily assuming $AB > AC$.

LESSON 5.6 **Exercise Set B**

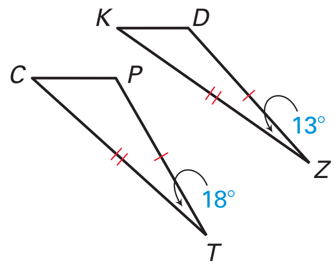
MM1G2a Use conjecture, inductive reasoning, deductive reasoning, counterexamples, and indirect proof as appropriate.

Copy and complete the statement with <, >, or =. *Explain*.

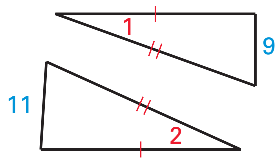
1. TP __?__ AG



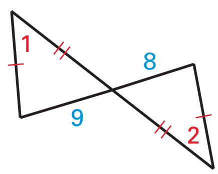
2. KD __?__ CP



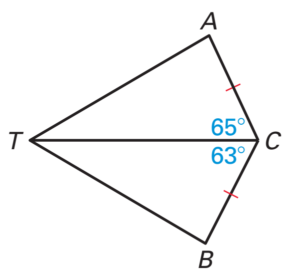
3. $m\angle 1$ __?__ $m\angle 2$



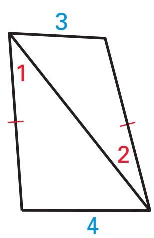
4. $m\angle 1$ __?__ $m\angle 2$



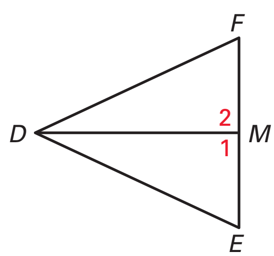
5. AT __?__ BT



6. $m\angle 1$ __?__ $m\angle 2$



In $\triangle DEF$, $\overline{DM}$ is a median. Determine if each statement is *always*, *sometimes*, or *never* true.



7. If $m\angle 2 > m\angle 1$, then $ED > FD$.

8. If $m\angle E > m\angle F$, then $\angle 1$ is obtuse.

9. If $\angle 2$ is acute, then $m\angle F > m\angle E$.

10. If $m\angle E < m\angle F$, then $m\angle 1 < m\angle 2$.

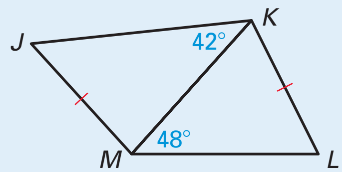
11. If $m\angle 2 > m\angle 1$, then $ED > FD$.

12. If $m\angle D = 90°$, then $FD > ED$.

UNIT 5

Exercise Set B *(continued)*

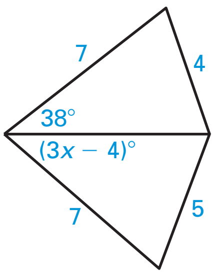
13. **Error Analysis** *Explain* why the student's reasoning is incorrect.



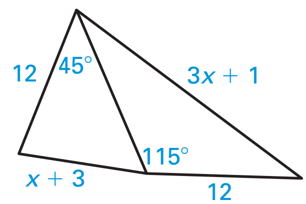
By the Hinge Theorem, $JK < ML$.

Use the Hinge Theorem or its converse and properties of triangles to write and solve an inequality to describe a restriction on the value of *x*.

14.



15.



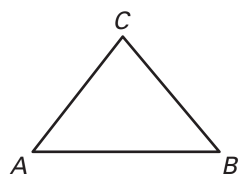
16. **Sailing** Two families are going sailing. Family A leaves the marina and sails 2.3 miles due north, then sails 3 miles due west. Family B leaves the marina and sails 2.3 miles due south, then sails 3 miles in a direction 1° north of due east. Which family is farther from the marina? *Explain* your reasoning.

In Exercises 17–19, write an indirect proof.

17. Prove Theorem 5.11, which is given on page 284.

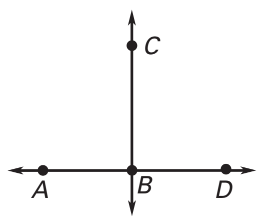
GIVEN: $m\angle A > m\angle B$

PROVE: $BC > AC$



18. **GIVEN:** $\angle ABC \cong \angle DBC$

PROVE: $\overline{BC} \perp \overline{AD}$



19. **GIVEN:** $\overline{RU}$ is an altitude, $\overrightarrow{RU}$ bisects $\angle SRT$.

PROVE: $\triangle RST$ is isosceles.