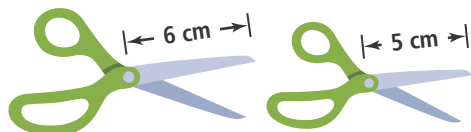




UNDERSTAND

8. **Error Analysis** Tonya has the scissors shown.



Tonya writes the following description of how she will use the Hinge Theorem with the scissors.

If you open the right pair of scissors to an angle of 30° and open the left pair of scissors to an angle of 45° , then by the Hinge Theorem, the distance between the blade tips of the left pair of scissors will be larger.

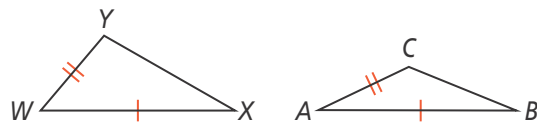


What is the mistake in her use of the Hinge Theorem?

9. **Construct Arguments** Write a paragraph proof of the Hinge Theorem.

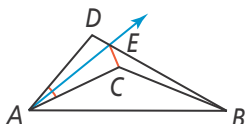
Given: $\overline{WX} \cong \overline{AB}$, $\overline{WY} \cong \overline{AC}$, $m\angle W > m\angle A$

Prove: $XY > BC$



Use the following outline.

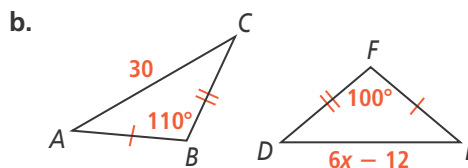
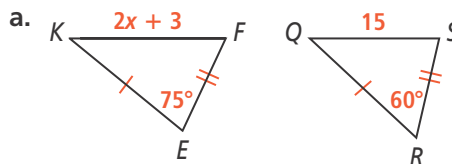
- Find a point D outside $\triangle ABC$ so $\overline{AD} \cong \overline{WY}$ and $\angle DAB \cong \angle YWX$.
- Show that $\triangle WXY \cong \triangle ABD$.
- Construct the angle bisector of $\angle CAD$. Let point E be the point where the angle bisector intersects $\overline{BD}$.



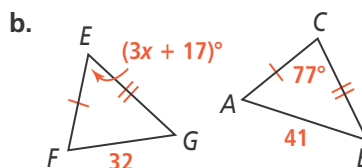
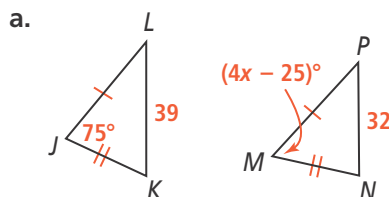
- Show that $\triangle ACE \cong \triangle ADE$ so $\overline{CE} \cong \overline{DE}$.
- Show that $DB = CE + EB$.
- Use the Triangle Inequality Theorem on $\triangle BCE$.

PRACTICE

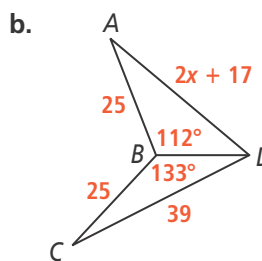
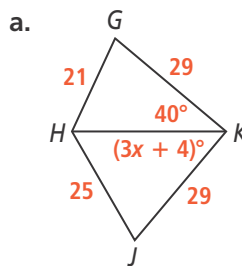
10. Write an inequality describing the range of x for each pair of triangles. SEE EXAMPLES 1 AND 2.



11. Write an inequality describing the possible values of x for each pair of triangles. SEE EXAMPLES 3 AND 4.



12. Write an inequality describing the possible values of x for each diagram.



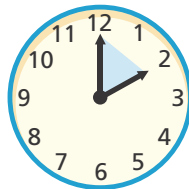
APPLY

- 13. Reason** Airplane A flies 300 miles due east of an airport and then flies 200 miles at 15° north of east. Airplane B flies 200 miles due north and then flies 300 miles at 20° west of north. Which airplane is closer to the airport? Explain how you know.

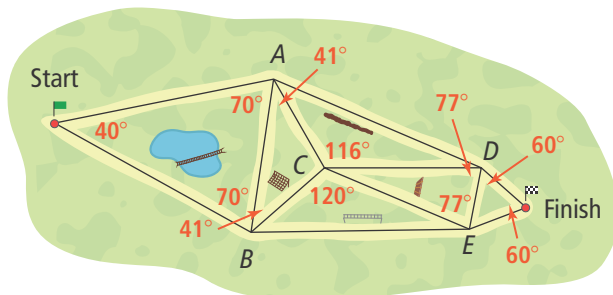


14. Model With Mathematics

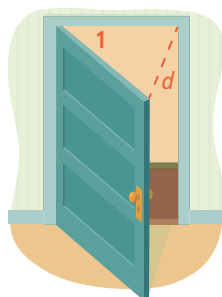
According to the Hinge Theorem, is the distance between the tips of the hands greater at 4:00 or at 7:00? Explain how the distance changes throughout a day.



- 15. Mathematical Connections** Determine the shortest path from start to finish on the obstacle course.

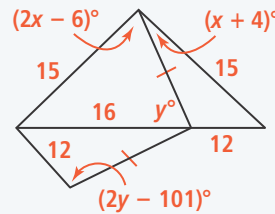


- 16. Higher Order Thinking** When $m\angle 1 = 75$, $d = 43$ in., and when $m\angle 1 = 100$, $d = 54$ in. Neil wants to know how wide a sofa he can buy if he can open the door at most 85° . Using the Hinge Theorem or the Converse of the Hinge Theorem, can you determine the exact value of d when $m\angle 1 = 85^\circ$? If you can, explain the method. If not, explain what you can determine about the distance.

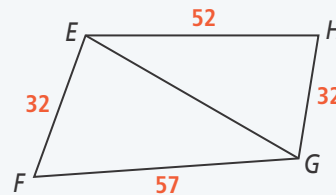


ASSESSMENT PRACTICE

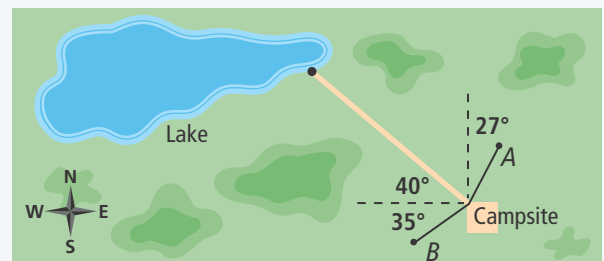
- 17.** Which of the following can you conclude from the diagram? Select all that apply.



- Ⓐ $x < 10$ Ⓒ $y < 101$
 Ⓑ $x > 10$ Ⓓ $y > 10$
- 18. SAT/ACT** Which of the following can you conclude from the diagram?



- Ⓐ $m\angle EFG = m\angle GHE$ Ⓒ $m\angle GEF > m\angle EGH$
 Ⓑ $m\angle FGE = m\angle HEG$ Ⓓ $m\angle FGE > m\angle EGH$
- 19. Performance Task** Abby, Danielle, and Jacy walk from their campsite to get to the lake. The lake is located 3 miles away in the direction of 40° north of west.



Part A Abby walks along a straight path in the direction of 27° east of north for 1 mile to point A. Using the Hinge Theorem, if Danielle walks along a straight path in the direction of 35° south of west for 1 mile to point B, who is closer to the lake?

Part B Jacy also walks for 1 mile from the campsite along a different straight path than Abby. Her straight-line distance to the lake is shorter than Abby's distance. What directions could Jacy have taken?