PRACTICE & PROBLEM SOLVING

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Practice | Tutorial

Additional Exercises Available Online

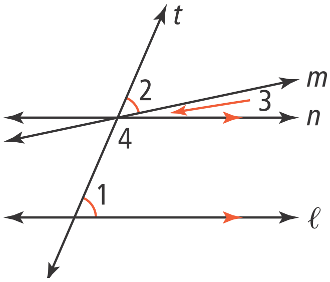
UNDERSTAND

8. **Construct Arguments** Write an indirect proof of the Converse of the Corresponding Angles Theorem following the outline below.

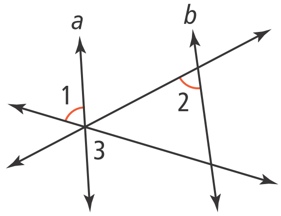
Given: $\angle 1 \cong \angle 2$

Prove: $\ell \parallel m$

- Assume that lines ℓ and m are not parallel.
- Draw line n parallel to line ℓ.
- Conclude that $m\angle 3 > 0$.
- Use the Same-Side Interior Angles Postulate to arrive at the contradiction that $m\angle 1 \neq m\angle 2$.

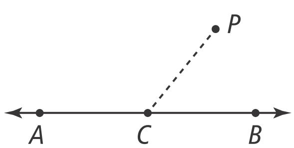


Error Analysis What is the student's error?

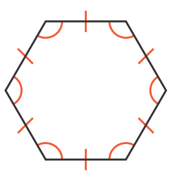


Given $\angle 1 \cong \angle 2$. By the Vertical Angles Thm., $\angle 1 \cong \angle 3$, so by the Transitive Property, $\angle 2 \cong \angle 3$. By the Converse of the Corresponding Angles Thm., $a \parallel b$. ✗

10. **Mathematical Connections** Copy the figure below. Construct a line through P parallel to ℓ. (*Hint:* Copy either $\angle PCA$ or $\angle PCB$ so that one of the sides of the angle is parallel to ℓ.) What theorem justifies your construction?

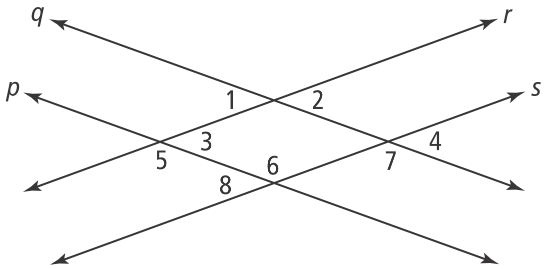


11. **Higher Order Thinking** The interior angles of a regular hexagon are congruent. Why are any pair of opposite sides parallel?



PRACTICE

For Exercises 12–15, use the given information. Which lines in the figure can you conclude are parallel? State the theorem that justifies each answer. SEE EXAMPLES 1 AND 3



12. $\angle 2 \cong \angle 3$

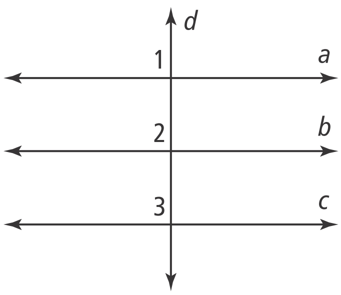
13. $\angle 6 \cong \angle 7$

14. $\angle 1 \cong \angle 4$

15. $m\angle 5 + m\angle 8 = 180°$

16. Write a flow proof of the Converse of the Alternate Exterior Angles Theorem. SEE EXAMPLE 2

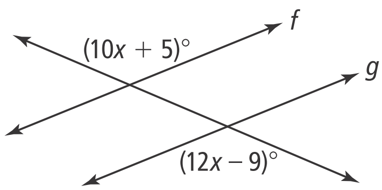
Use the figure for Exercises 17 and 18. SEE EXAMPLE 2



17. Given $a \parallel c$ and $b \parallel c$, write a flow proof of Theorem 2-8.

18. Given $a \perp d$ and $b \perp d$, write a flow proof of Theorem 2-9.

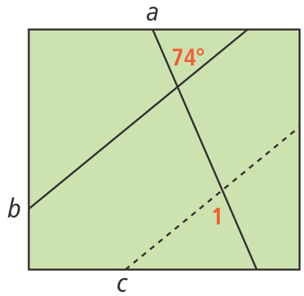
19. For what value of x is $f \parallel g$? Which theorem justifies your answer? SEE EXAMPLE 4



PRACTICE & PROBLEM SOLVING

APPLY

20. **Look for Relationships** To make a puzzle, Denzel draws lines a and b to cut along on a square piece of posterboard. He wants to draw line c so that it is parallel to line b. What should the measure of $\angle 1$ be? Explain.

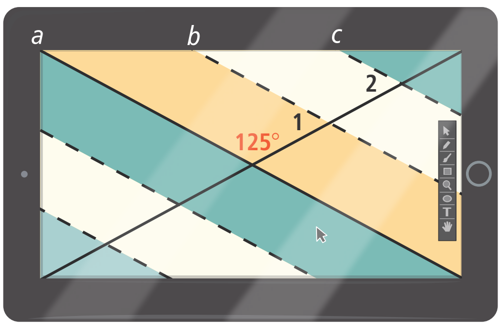


21. **Reason** A downhill skier is fastest when her skis are parallel. What should $\angle 1$ be in order for the skier to maximize her speed through a gate? Which theorem justifies your answer?

22. **Make Sense and Persevere** Malia makes a fabric design by drawing diagonals between opposite corners. She wants to draw other lines parallel to one of the diagonal lines, as shown by the dashed lines.

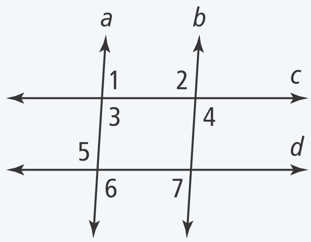
a. What should $\angle 1$ be in order for line b to be parallel to line a? Explain.

b. What should $\angle 2$ be in order for line c to be parallel to line b? Explain.

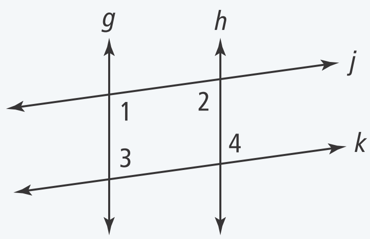


ASSESSMENT PRACTICE

23. In order for $c \parallel d$, $\angle 2$ and $\angle 7$ must be __?__, and $\angle 3$ and $\angle 5$ must be __?__.

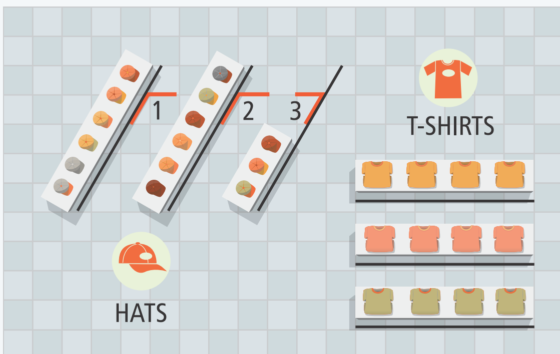


24. **SAT/ACT** Which statement must always be true?



Ⓐ If $\angle 1 \cong \angle 2$, then $g \parallel h$.
Ⓑ If $\angle 1 \cong \angle 3$, then $g \parallel h$.
Ⓒ If $\angle 2 \cong \angle 4$, then $j \parallel k$.
Ⓓ If $\angle 3 \cong \angle 4$, then $j \parallel k$.

25. **Performance Task** The diagram shows part of a plan to arrange aisles in a store.



Part A The aisles are arranged so that $m\angle 1 = 125$. What should be the measures of the other labeled angles so that all three aisles will be parallel? Explain.

Part B Describe how theorems can be applied to make sure that the T-shirt aisles are parallel.