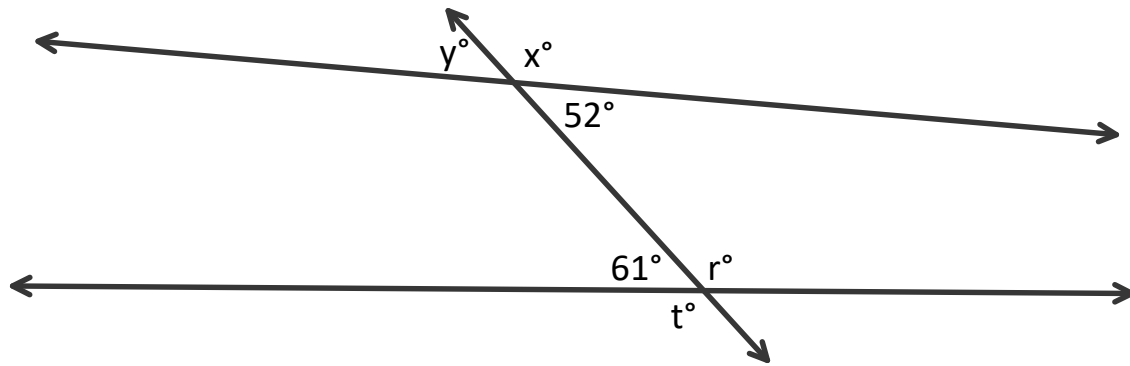


WARM UP

Given the diagram and the angle measures shown, find the values of x , y , t , and r .



ESSENTIAL QUESTION

What angle relationships can be used to prove that two lines intersected by a transversal are parallel?

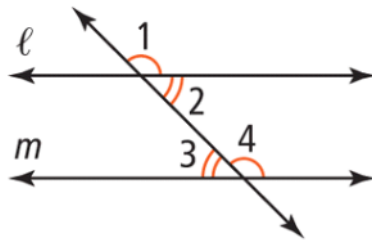
GOAL: "I CAN...

Use angle relationships to prove that lines are parallel."

EXPLORE

Given the diagram below, do you and your group believe that there is enough information to say

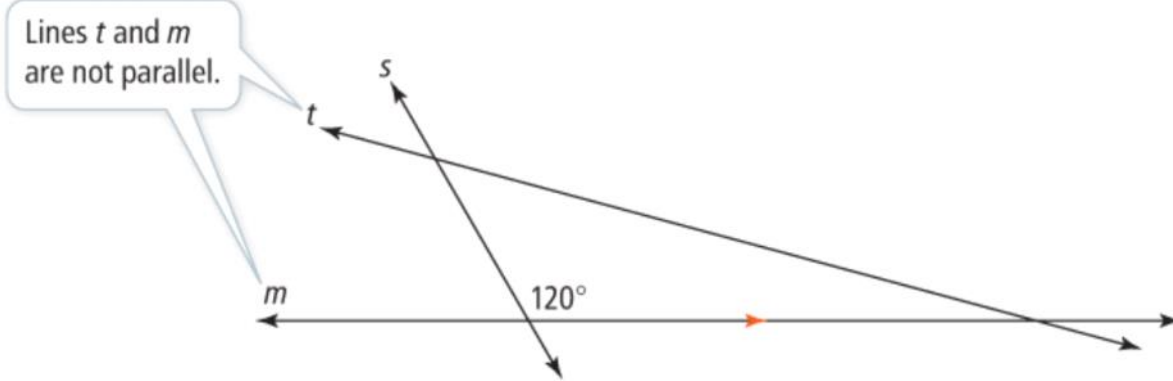
that line ℓ is parallel to line m ?



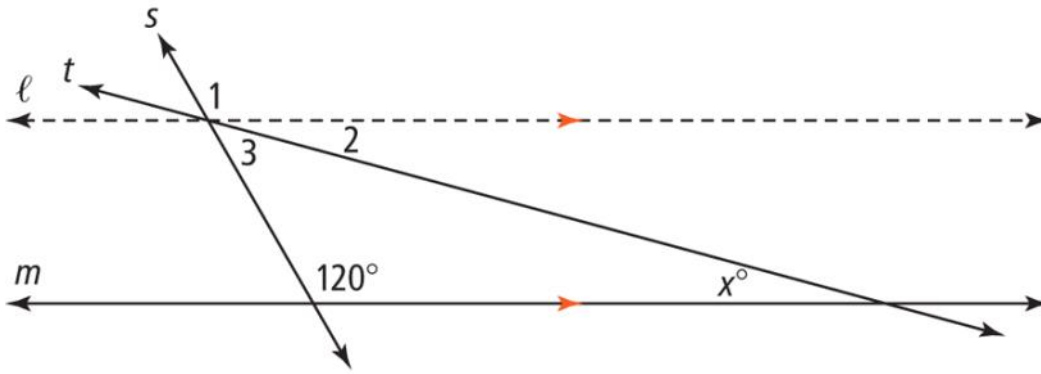
EXAMPLE 1

Understand Angle Relationships

Suppose two lines are not parallel. Can corresponding angles still be congruent?



1. Could $\angle 3$ be supplementary to a 120° angle? Explain.

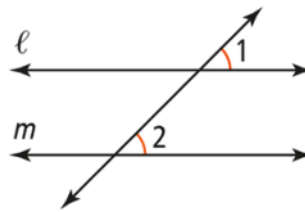


Converse of the Corresponding Angles Theorem

If two lines and a transversal form corresponding angles that are congruent, then the lines are parallel.

PROOF: SEE EXERCISE 8.

If...



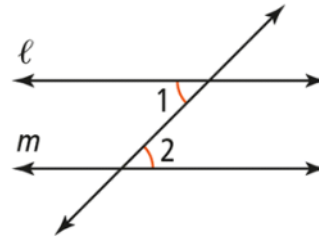
Then... $l \parallel m$

Converse of the Alternate Interior Angles Theorem

If two lines and a transversal form alternate interior angles that are congruent, then the lines are parallel.

PROOF: SEE EXAMPLE 2.

If...

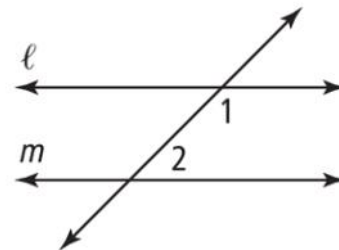


Then... $\ell \parallel m$

Converse of the Same-Side Interior Angles Postulate

If two lines and a transversal form same-side interior angles that are supplementary, then the lines are parallel.

If... $m\angle 1 + m\angle 2 = 180$

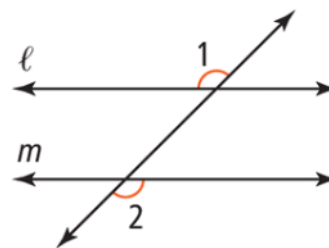


Then... $\ell \parallel m$

Converse of the Alternate Exterior Angles Theorem

If two lines and a transversal form alternate exterior angles that are congruent, then the lines are parallel.

If...



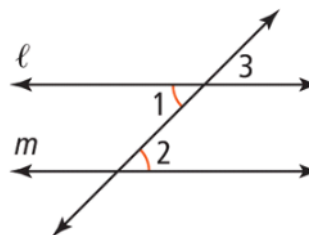
Then... $l \parallel m$

EXAMPLE 2

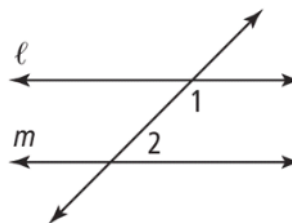
Write a flow proof to prove the Converse of the Alternate Interior Angles Theorem.

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

Prove: $l \parallel m$

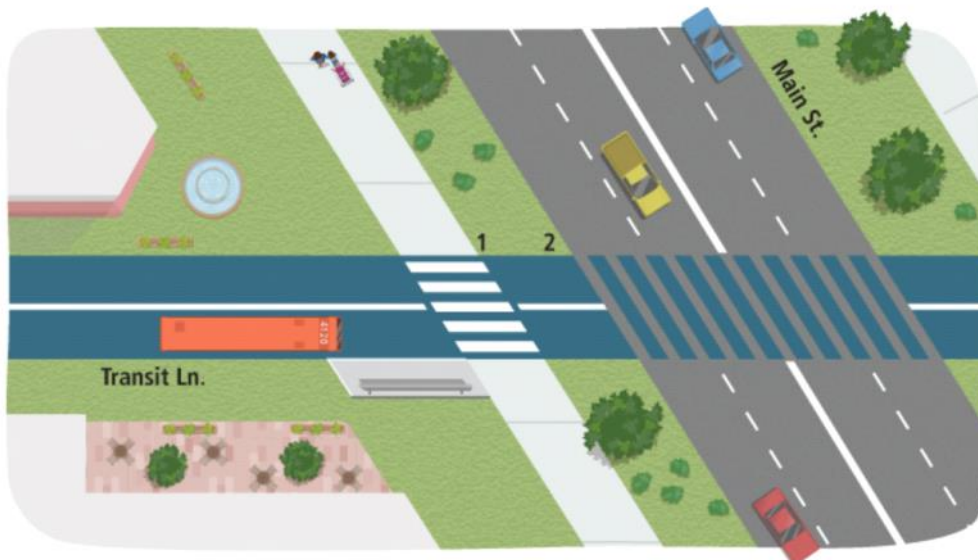


2. Write a flow proof for Theorem 2-6, the Converse of the Same-Side Interior Angles Postulate.

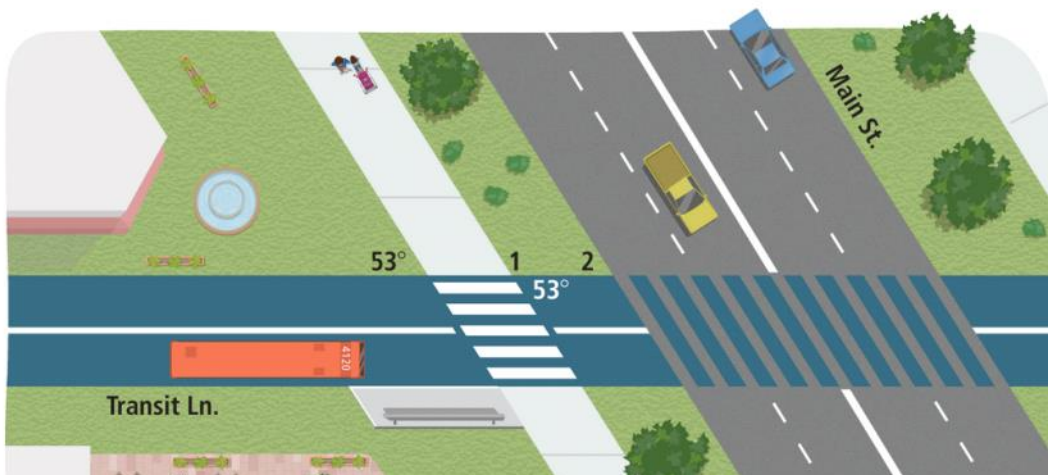


EXAMPLE 3 Determine Whether Lines Are Parallel

The edges of a new sidewalk must be parallel in order to meet accessibility requirements. Concrete is poured between straight strings. How does an inspector know that the edges of the sidewalk are parallel?



3. What is $m\angle 1$? What should $\angle 2$ measure in order to guarantee that the sidewalk is parallel to Main Street? Explain.





THEOREM 2-8

If two lines are parallel to the same line, then they are parallel to each other.

PROOF: SEE EXERCISE 17.

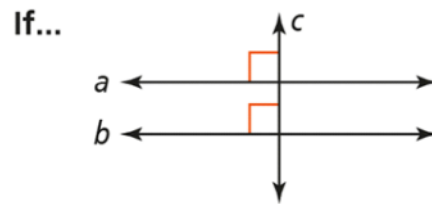


Then... $a \parallel b$

THEOREM 2-9

If two lines are perpendicular to the same line, then they are parallel to each other.

PROOF: SEE EXERCISE 18.

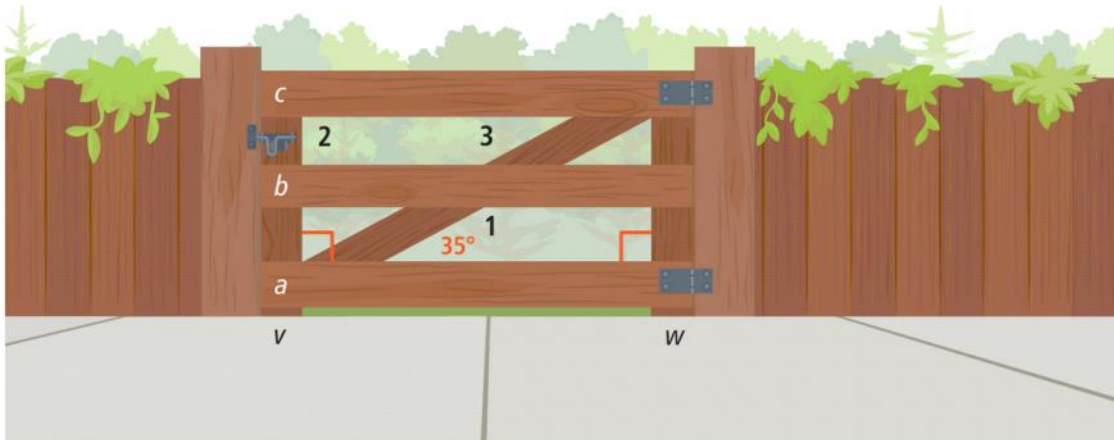


Then... $a \parallel b$

EXAMPLE 4

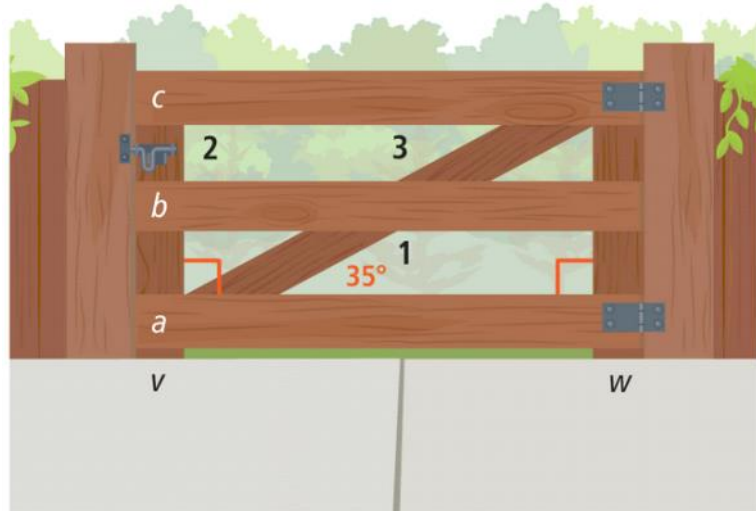
A. When building a gate, how does Bailey know that the vertical boards v and w are parallel?

B. What should $\angle 1$ measure to ensure board b is parallel to board a ?



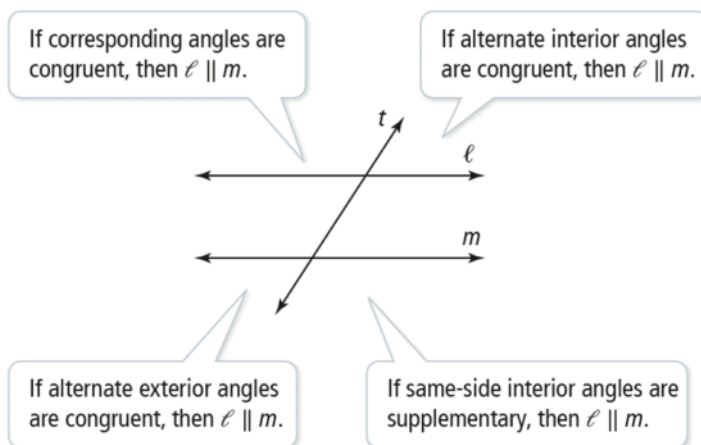
4. a. Bailey also needs board c to be parallel to board a . What should $\angle 2$ measure? Explain.

b. Is $b \parallel c$? Explain.



Criteria for Parallel lines

DIAGRAM



HOMWORK

Pg. 83

9, 10, 12-15, 19, 24

