2.2 Angles Formed by Parallel Lines

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GOAL

Prove properties of angles formed by parallel lines and a transversal, and use these properties to solve problems.

EXPLORE...

- Parallel bars are used in therapy to help people recover from injuries to their legs or spine. How could the manufacturer ensure that the bars are actually parallel?

SAMPLE ANSWER

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APPLY the Math

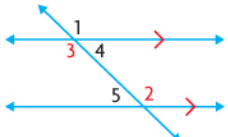
EXAMPLE 1 Reasoning about conjectures involving angles formed by transversals

Pull for Lesson Notes

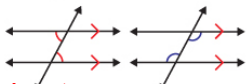
Make a conjecture that involves the interior angles formed by parallel lines and a transversal. Prove your conjecture.

Tuyet's Solution

My conjecture: When a transversal intersects a pair of parallel lines, the **alternate interior angles** are equal.



alternate interior angles
Two non-adjacent interior angles on opposite sides of a transversal.



2 column proof

Reason

This is what we are trying to prove, so we need to end with < 3 = < 2

Statement	~~Justification~~	
$\angle 1 = \angle 2$	Corresponding angles	I drew two parallel lines and a transversal as shown, and I numbered the angles. I need to show that $\angle 3 = \angle 2$.
		Since I know that the lines are parallel, the corresponding angles are equal.
$\angle 1 = \angle 3$	Vertically opposite angles	When two lines intersect, the opposite angles are equal.
$\angle 3 = \angle 2$	Transitive property	$\angle 2$ and $\angle 3$ are both equal to $\angle 1$, so $\angle 2$ and $\angle 3$ are equal to each other.

My conjecture is proved.

a = b
b = c
a = c

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EXAMPLE 1 Reasoning about conjectures involving angles formed by transversals

Read over page 75 for another way to do Example 1:

Make a conjecture that involves the interior angles formed by parallel lines and a transversal. Prove your conjecture.

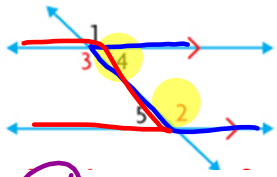
Ali's Solution http://math4teaching.com/wp-content/uploads/2011/05/transversal-1.html

My conjecture: When a transversal intersects a pair of parallel lines, the interior angles on the same side of the transversal are supplementary.

Statement Reason

$\angle 4 + \angle 2 = 180$

First, construct a diagram:



Statement	Reason
$\angle 4 = \angle 5$	Alternate interior
$\angle 5 + \angle 2 = 180$	Supplementary angles
$\angle 4 + \angle 2 = 180$	Transitive

Statement	Reason
$\angle 1 = \angle 2$	corresponding angles
$\angle 2 + \angle 5 = 180^\circ$	Supplementary
$\angle 1 + \angle 5 = 180^\circ$	$\angle 2 = \angle 1$
$\angle 4 = \angle 5$	Alternate interior

Nov 28-8:19 AM

Attachments

PM11-2s2.gsp

2s2e3 finalt.mp4

2s2e1 final.mp4

2s2e2 final.mp4

PM11-2s2-review.gsp