Lesson 3.7 Parallel Lines & Transversals

Sunday, October 18, 2026 9:46 PM

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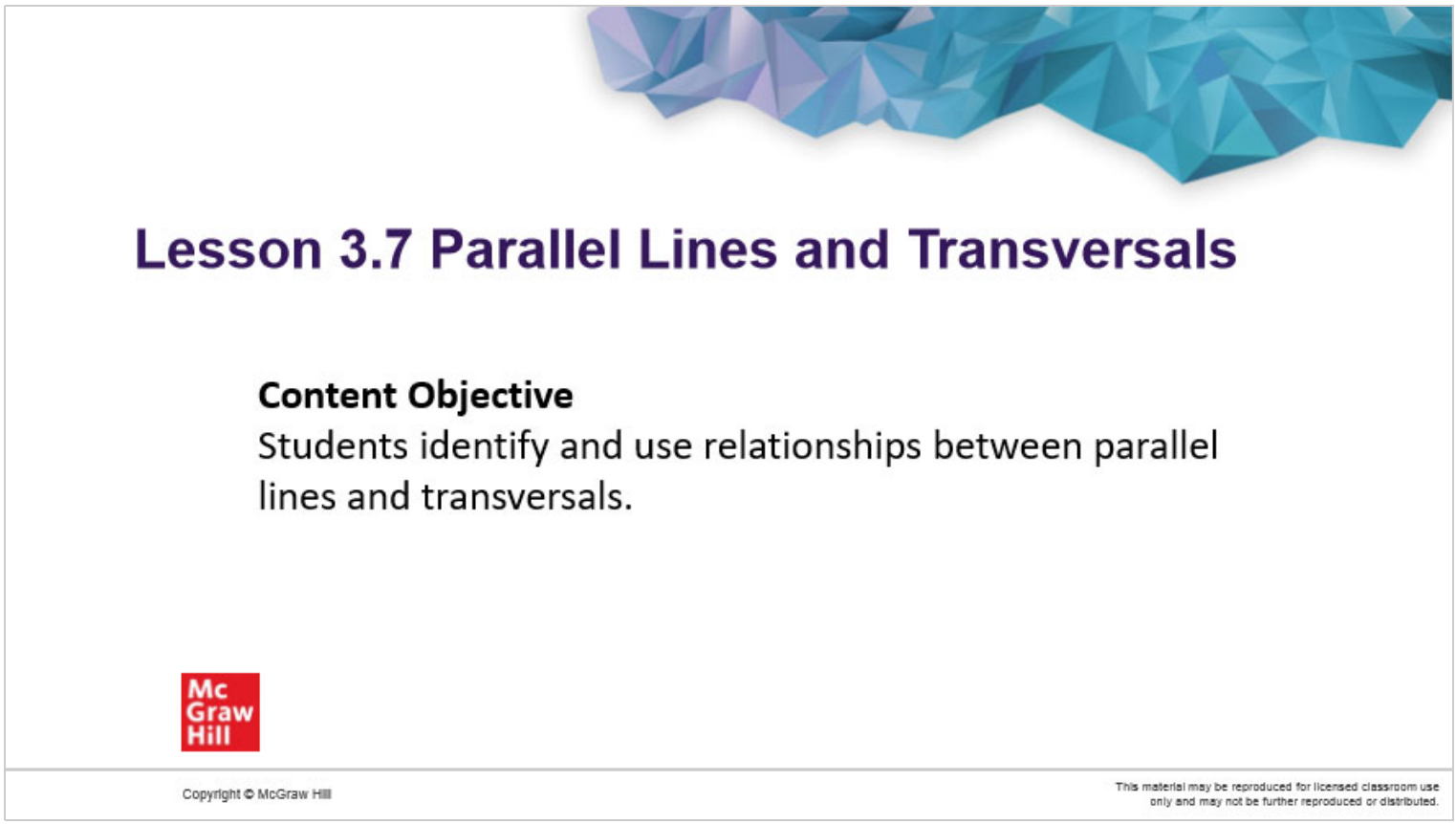
Lesson 3.7 Parallel Li...



Florida's B.E.S.T. Standards for Mathematics

MA.912.GR.1.1

Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.

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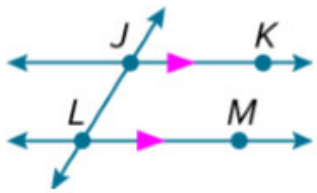
Learn

Parallel Lines and Transversals

If two lines do not intersect, then they are either parallel or skew.

Parallel and Skew	
Parallel lines are coplanar lines that do not intersect. **Example** $\overleftrightarrow{JK} \parallel \overleftrightarrow{LM}$	

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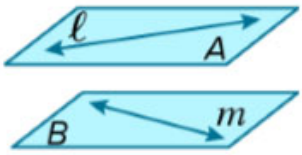
Parallel Lines and Transversals

Parallel and Skew	
Skew lines are lines that do not intersect and are not coplanar. **Example** Lines ℓ and m are skew.	
Parallel planes are planes that do not intersect. **Example** Planes $\mathcal{A}$ and $\mathcal{B}$ are parallel.	

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Example 1
Identify Parallel and Skew Relationships

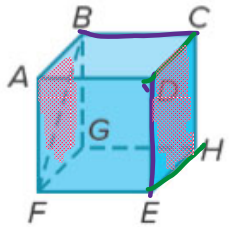
Identify each of the following using the cube shown. Assume lines and planes that appear to be parallel or perpendicular are parallel or perpendicular, respectively.

a. all lines skew to $\overleftrightarrow{BC}$ DE

b. all lines parallel to $\overleftrightarrow{EH}$ CD

c. all planes parallel to plane *DCH*

Plane ABG



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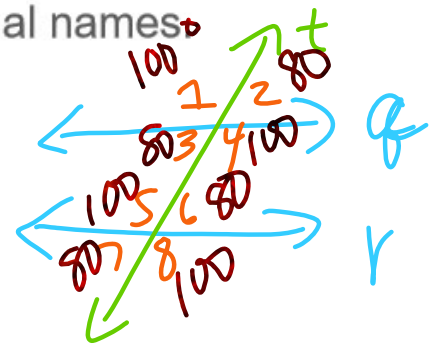
Parallel Lines and Transversals

A line that intersects two or more lines in a plane at different points is called a **transversal**. Draw below, line t is a transversal of lines q and r. Line t forms a total of eight angles with lines q and r. These angles and specific pairings of these angles are given special names.



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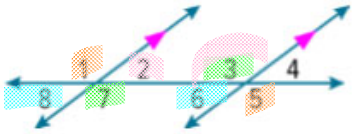
Angles and Parallel Lines

If two lines are parallel and cut by a transversal, then there are special relationships in the angle pairs formed by the lines.



Theorem 3.14: Corresponding Angles Theorem

If two parallel lines are cut by a transversal, then each pair of corresponding angles is congruent.

$\angle 1 \cong \angle 3$,
$\angle 2 \cong \angle 4$,
$\angle 5 \cong \angle 7$,
$\angle 6 \cong \angle 8$

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Angles and Parallel Lines

Theorem 3.15: Alternate Interior Angles Theorem

If two parallel lines are cut by a transversal, then each pair of alternate interior angles is congruent.

$\angle 2 \cong \angle 6$,
$\angle 3 \cong \angle 7$

(Same side)

Theorem 3.16: Consecutive Interior Angles Theorem

If two parallel lines are cut by a transversal, then each pair of consecutive interior angles is supplementary.

$\angle 2$ and $\angle 3$,
$\angle 6$ and $\angle 7$

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Theorem 3.17: Alternate Exterior Angles Theorem

If two parallel lines are cut by a transversal, then each pair of alternate exterior angles is congruent.

$\angle 1 \cong \angle 5$,
$\angle 4 \cong \angle 8$



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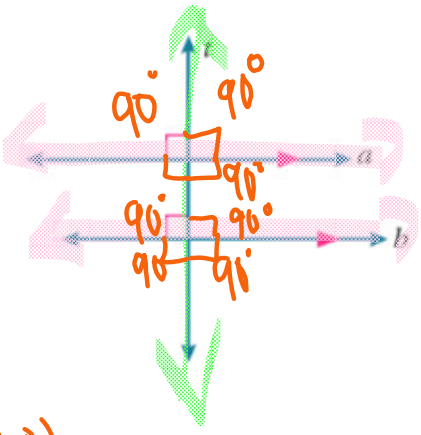
Angles and Parallel Lines

A special relationship also exists when the transversal of two parallel lines is a perpendicular line.

Theorem 3.18: Perpendicular Transversal Theorem

90°

In a plane, if a line is perpendicular to one of two parallel lines, then it is perpendicular to the other.



Example If $a \parallel b$ and $a \perp t$, then $b \perp t$.

parallel → perpendicular (90°)

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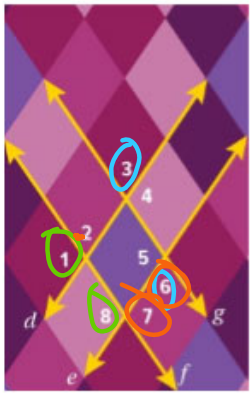
Example 3
Identify Transversals and Classify Angle Pairs

Identify the transversal connecting each pair of angles in the photo. Then classify the relationship between each pair of angles.



∠1 and ∠8 corresponding (≅)

∠3 and ∠6 alternate exterior (≅)

∠6 and ∠7 same side (consecutive interior) angles 180°

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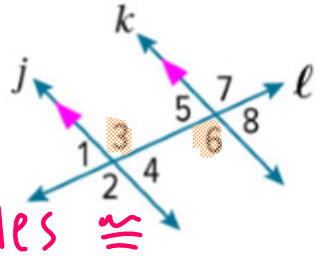
Example 5
Find Values of Variables

Use the figure to find the value of the indicated variable. Find all angle values.



a. If $m\angle 3 = (4x + 7)°$ and $m\angle 6 = (5x - 13)°$, find the value of x. alternate interior angles ≅

b. Find the value of y if $m\angle 8 = 68°$ and $m\angle 3 = (3y - 2)°$.

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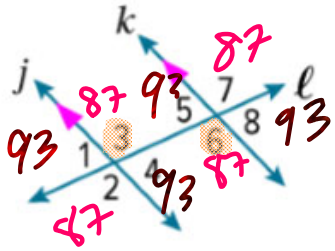
Example 5
Find Values of Variables

87 87 180 − 87 = 93

4(20)+7 5(20)−13

a. If $m\angle 3 = (4x + 7)°$ and $m\angle 6 = (5x - 13)°$, find the value of x.



$4x + 7 = 5x - 13$

$-4x \quad -4x$

$7 = x - 13$

$+13 \quad +13$

$20 = x$

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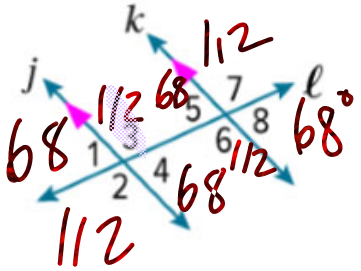
Example 5
Find Values of Variables

b. Find the value of *y* if $m\angle 8 = 68°$ and $m\angle 3 = (3y - 2)°$.

$3y - 2 = 112$
$+2 \quad +2$
$3y = 114$
$y = 38$



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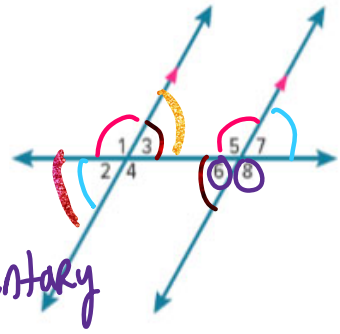
Exit Ticket

Use the figure to complete the table.

	Angles	Name	Relationship
1.	∠1 and ∠5	Corresponding	equal
2.	∠3 and ∠6	alternate interior	equal
3.	∠2 and ∠7	alternate exterior	equal
4.	∠6 and ∠8	Linear Pair	180 Supplementary
5.	∠2 and ∠3	Vertical angles	equal



6. How many different angle measures are there among the eight angles formed when two parallel lines are cut by a transversal? 2

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