Explore Relationships Between Angles and Parallel Lines

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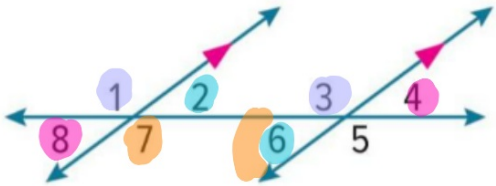
Use dynamic geometry software to complete the Explore.

INQUIRY How do parallel lines affect the relationships between special angle pairs?

WB pg 183

Learn 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 → **Corresponding Angles Theorem**

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

$\angle 1 \cong \angle 3$

Theorem → **Alternate Interior Angles Theorem**

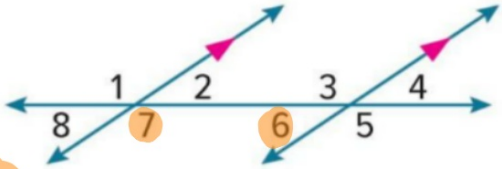
If two parallel lines are cut by a transversal, then each pair of alternate interior angles is congruent.

$\angle 2 \cong \angle 6$

Theorem → Consecutive Interior Angles Theorem

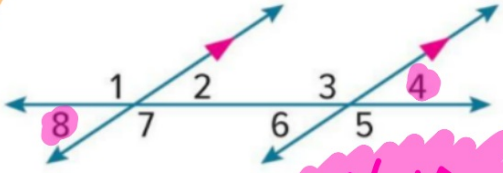
If two parallel lines are cut by a transversal, then each pair of consecutive interior angles is supplementary.

180



Theorem → Alternate Exterior Angles Theorem

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



$\angle 4 \cong \angle 8$

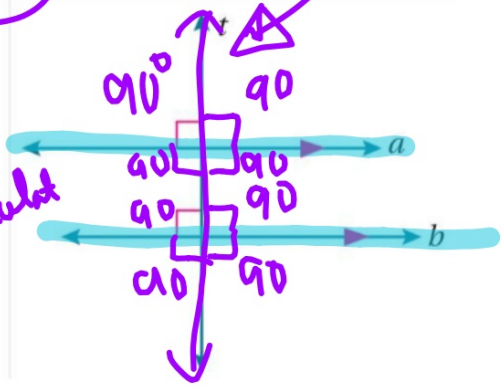
Theorem 3.18: Perpendicular Transversal Theorem

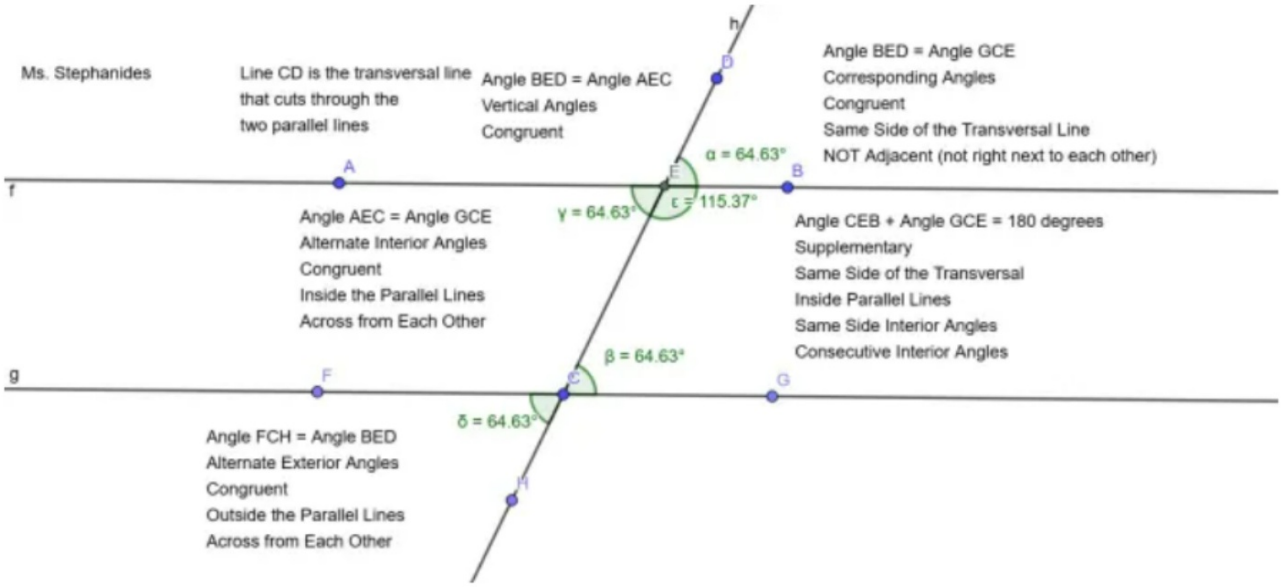
In a plane, if a line is perpendicular to one of two parallel lines, then it is perpendicular to the other.

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

parallel

perpendicular




Ms. Stephanides
Line CD is the transversal line that cuts through the two parallel lines
Angle BED = Angle AEC
Vertical Angles
Congruent
Angle BED = Angle GCE
Corresponding Angles
Congruent
Same Side of the Transversal Line
NOT Adjacent (not right next to each other)
h
D
A
E
B
f
α = 64.63°
γ = 64.63°
ε = 115.37°
Angle AEC = Angle GCE
Alternate Interior Angles
Congruent
Inside the Parallel Lines
Across from Each Other
Angle CEB + Angle GCE = 180 degrees
Supplementary
Same Side of the Transversal
Inside Parallel Lines
Same Side Interior Angles
Consecutive Interior Angles
β = 64.63°
g
F
C
G
δ = 64.63°
Angle FCH = Angle BED
Alternate Exterior Angles
Congruent
Outside the Parallel Lines
Across from Each Other
H