Geometry
2.5 Proving Statements about Lines and Angles Day 2

Name: Key
Date: _____ Period : _____

LEARNING TARGETS

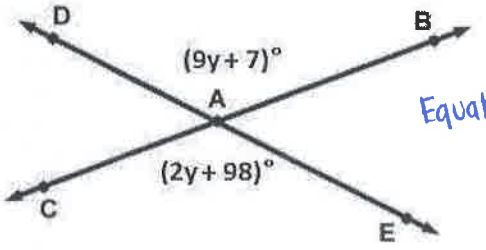
- I can write logical arguments using properties from algebra and geometry.

REASON BANK

Addition Property	Division Property
Alternate Interior Angles Theorem	Distributive Property
Alternate Interior Angles Converse Theorem	Given
Alternate Exterior Angles Theorem	Linear Pair Postulate
Alternate Exterior Angles Converse Theorem	Multiplication Property
Combine Like Terms	Simplification
Consecutive Interior Angles Theorem	Substitution Property
Consecutive Interior Angles Converse Theorem	Subtraction Property
Corresponding Angles Postulate	Transitive Property
Corresponding Angles Converse Postulate	Vertical Angles Theorem

Example 1:

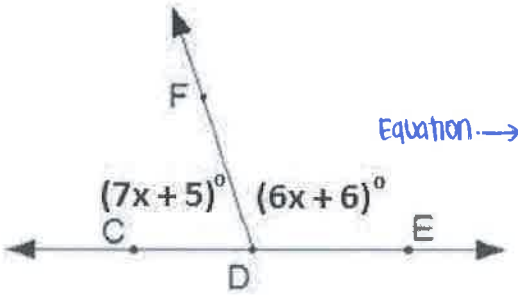
a. Given the diagram below and m∠DAB = (9y+7)° and m∠CAE = (2y+98)°, prove that y = 13.



Equation →

Statements	Reasons
1. $m\angle DAB=(9y+7)^\circ$, $m\angle CAE=(2y+98)^\circ$	1. Given
2. $9y+7=2y+98$	2. Vertical Angles Theorem
3. $7y+7=98$	3. Subtraction Prop.
4. $7y=91$	4. Subtraction Prop.
5. $y=13$	5. Division Prop.

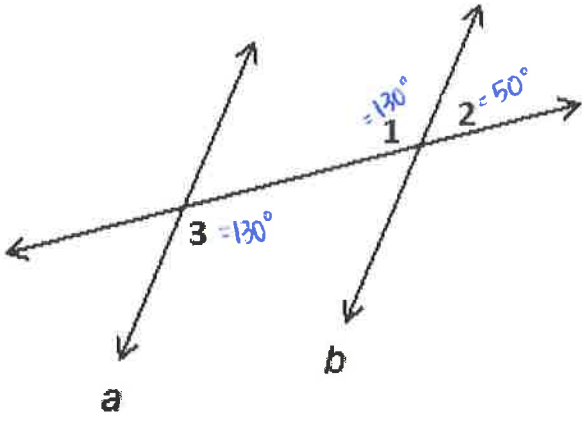
b. Given the diagram below, m∠FDC = $(7x+5)^\circ$ and m∠FDE = $(6x+6)^\circ$, prove that m∠FDE = 84°.



Equation →

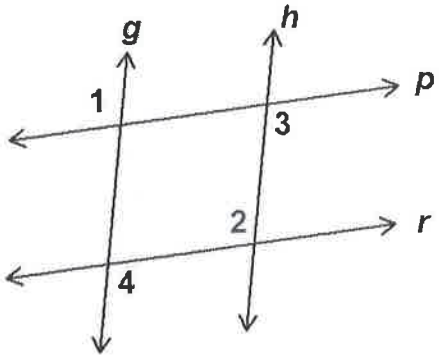
Statements	Reasons
1. $m\angle FDC=(7x+5)^\circ$, $m\angle FDE=(6x+6)^\circ$	1. Given
2. $7x+5+6x+6=180$	2. Linear Pair Postulate
3. $13x+11=180$	3. Combine Like Terms
4. $13x=169$	4. Subtraction Prop
5. $x=13$	5. Division Prop.
6. $m\angle FDE=6(13)+6$	6. Substitution
7. $m\angle FDE=84^\circ$	7. Simplification

Example 2: Given m∠2 = 50° and m∠3 = 130°, Please prove $a \| b$.



Statements	Reasons
1. m∠2 = 50°, m∠3 = 130°	1. Given
2. m∠1 + 50° = 180°	2. Linear Pair Postulate
3. m∠1 = 130°	3. Subtraction Property
4. $a \| b$	4. alt. int. angles converse

3. Given: ∠1 ≅ ∠3
Prove: ∠2 ≅ ∠4



Statements	Reasons
1) ∠1≅∠3	1) Given
2) g‖h	2) alt. ext. angles converse
3) ∠2≅∠4	3) alt. int. angles theorem

Example 4:

a. If AB = 8, and 8 = CD, then AB = CD.

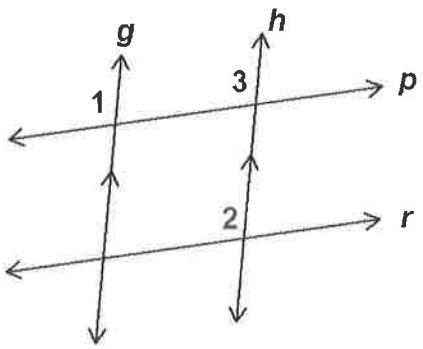
b. If $\overleftrightarrow{AB} \| \overleftrightarrow{CD}$ and $\overleftrightarrow{EF} \| \overleftrightarrow{CD}$, then $\overleftrightarrow{AB} \| \overleftrightarrow{EF}$.

To complete these statements, you used the transitive Property.

Transitive **Property: If a = b and b = c, then a = c.**

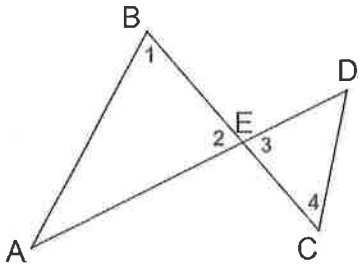
Example 5: Using the Transitive Property in Proofs

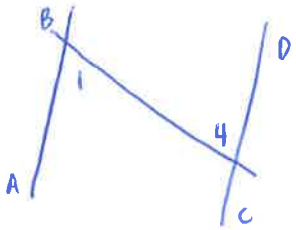
a. Given: $g \parallel h$ and $\angle 1 \cong \angle 2$
Prove: $p \parallel r$



Statements	Reasons
1) $g \parallel h$	1) Given
2) $\angle 1 \cong \angle 3$ (use)	2) corresponding angles postulate
3) $\angle 1 \cong \angle 2$	3) Given
4) $\angle 2 \cong \angle 3$ (use)	4) transitive property
5) $p \parallel r$	5) corresponding angles converse

b. Given: $\angle 1 \cong \angle 2$ and $\angle 3 \cong \angle 4$
Prove: $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$





Statements	Reasons
1) $\angle 1 \cong \angle 2$	1) Given
2) $\angle 2 \cong \angle 3$	2) Vertical Angles Theorem
3) $\angle 3 \cong \angle 4$	3) Given
4) $\angle 1 \cong \angle 4$ (use)	4) Transitive Prop.
5) $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	5) alt. int. angles converse