Name: _____ Per: _____

Translating Explanations into Reasons

So far, we've been explaining our steps using colloquial, or casual, language. Now, however, we must begin to explain the math like mathematicians. This simply means that instead of writing a sentence explaining each step, you'll explain each step of math using technical math terms. The process of explaining remains the same. The difference is simply that you must not speak English any longer. You must learn to speak Math. Today, we'll translate our casual English explanations into technical Math vocabulary.

Explanations we're used to…	**Technical Math Term for that Explanation**
Each Step of Math	Statements
What I did/knew to get to that step of Math	Reasons

The problem told me It says so on the picture Copied the angle measures from the problem	Given

Added $6x$ to **both sides** Added 4 to **both sides** Added MN to **both sides**	Addition Property of Equality
Subtracted $2x$ from **both sides** Subtracted 9 from **both sides** Subtracted $m\angle 2$ from **both sides**	Subtraction Property of Equality
Multiplied **both sides** by 9 Multiplied **both sides** by A	Multiplication Property of Equality
Divided **both sides** by 5 Divided **both sides** by h	Division Property of Equality

Multiplied the numbers on **one side** Combined like terms on the left Solved **one side** to get what $m\angle 2$ equals	Simplify
Distribute the 2 to everything inside the ( )	Distributive Property

Congruent angles are equal angles Equal segments are congruent segments If they're congruent, then their sizes are equal Congruent means they're equal	Definition of Congruence

It's segment addition. part1 + part2 = whole If you add the two parts of the segment, you'll get all of it	Segment Addition Postulate
It's angle addition. part1 + part2 = whole If you add the two angle parts, you'll get the whole thing	Angle Addition Postulate

Midpoint means part1 $\cong$ part2 If it's a midpoint, then the parts are the same Midpoint means 2(part) = whole Midpoint means that the whole thing is twice as big as one part	Definition of a Midpoint
Bisect means part1 $\cong$ part2 If it's a Bisector, then the parts are the same Bisect means 2(part) = whole Bisect means that the whole is twice as big as one part	Definition of a Bisector

Vertical angles are congruent Vertical angles are the same They're across an X from each other, so they're the same	Vertical Angles Theorem
Linear pairs add to = 180, so I added $m\angle + m\angle = 180^\circ$ They're a linear pair, so they add to equal 180° Linear Pair Angles are supplementary Linear Angle1 + Linear Angle2 = 180°	Linear Pair Theorem

They're complementary. comp1 + comp2 = 90° Complementary means they add to equal 90°	Definition of Complementary Angles
They're supplementary. supp1 + supp2 = 90° Supplementary means they add to equal 180°	Definition of Supplementary Angles

Plugged *x* into the equation Plugged in $AB = 3x$ & $BC = 9x + 1$ Replaced x with what it **equals** Replaced $m\angle 2$ with $m\angle 3$ because they're **equal** Replaced RS with ST because they're **equal**	Substitution Property of **Equality**
Replaced $\overline{RS}$ with $\overline{ST}$ because they're **congruent** Replaced $\angle 2$ with $\angle 3$ because they're the same	Substitution Property of **Congruence**
Switched the sides of the **=** to get *x* on the left Switched one side of the **equal sign** with the other	Symmetric Property of **Equality**
Switched the sides of the $\cong$ to get $\overline{HI}$ on the left Switched one side of the **congruent** side with the other	Symmetric Property of **Congruence**
They're the same number. 7 is 7 AB equals itself ($AB = AB$)	Reflexive Property of **Equality**
They're the same figure. $\overline{GH}$ is $\overline{GH}$ $\angle LMN$ is congruent to itself ($\angle LMN \cong \angle LMN$)	Reflexive Property of **Congruence**
I skipped the middle. $x = y, y = z$... so *x* is just *z*	Transitive Property of **Equality**
I skipped the middle. $\angle 4 \cong \angle 9, \angle 9 \cong \angle 11$... so $\angle 4$ is $\angle 11$	Transitive Property of **Congruence**

Name: _____ Per: _____

Use the Translation Guide on the previous page to match the **Explanations** on the left with the correct **Reasons** on the right. Draw a line connecting the matching items.

Explanations		Reasons
Combined the like terms on the right side	•	• Angle Addition Postulate
Supplementary Angles add to equal 180°	•	• Subtraction Property of Equality
For connected angles, part1 + part2 = whole	•	• Substitution Property of Equality
Plugged in HT for AR, since they're equal	•	• Vertical Angles Theorem
Subtracted 3 from both sides	•	• Given
If it's a midpoint, then part1 ≅ part2	•	• Reflexive Property of Congruence
Divided both sides by KL	•	• Segment Addition Postulate
If they're vertical, then they're congruent	•	• Simplify
It was just part of the problem written at the top	•	• Definition of Supplementary Angles
$m\angle 3$ is equal to $m\angle 3$. The angle is itself.	•	• Definition of a Bisector
Multiplied 7 to everything in the parentheses	•	• Transitive Property of Equality
Switched the sides of the equal sign	•	• Addition Property of Equality
Skipped the middle. $\overline{PQ} \cong \overline{AB}, \overline{AB} \cong \overline{LM}$. So, $\overline{PQ}$ is $\overline{LM}$	•	• Substitution Property of Congruence
Since $m = n$ & $n = p$, $m = p$	•	• Definition of Congruence
Equal angles are congruent angles	•	• Reflexive Property of Equality
Complementary1 + Complementary2 = 90°	•	• Symmetric Property of Congruence
$\overline{LM}$ is $\overline{LM}$	•	• Multiplication Property of Equality
If you add the two parts of the segment, you get the whole	•	• Linear Pair Theorem
Replaced ∠8 with ∠1 because they're the same	•	• Transitive property of Congruence
Added $17x$ to both sides of the equation	•	• Division Property of Equality
Multiplied 7 to both sides of the equation	•	• Definition of Complementary Angles
Bisect means that 2(part) = whole	•	• Definition of a Midpoint
Switched what was on the left of ≅ with what was on the right	•	• Symmetric Property of Equality
Linear Pair Angles add to equal 180°	•	• Distributive Property

For each **Reason**, write what the term means as *you would explain it normally*. Use your own words—don't just copy what we used earlier.

Reason	**What it means in casual language**
Given	
Addition Property of Equality	
Subtraction Property of Equality	
Multiplication Property of Equality	
Division Property of Equality	
Simplify	
Distributive Property	
Definition of Congruence	
Segment Addition Postulate	
Angle Addition Postulate	
Definition of a Midpoint	
Definition of a Bisector	
Vertical Angles Theorem	
Linear Pair Theorem	
Definition of Complementary Angles	
Definition of Supplementary Angles	
Substitution Property of Equality	
Substitution Property of Congruence	
Symmetric Property of Equality	
Symmetric Property of Congruence	
Reflexive Property of Equality	
Reflexive Property of Congruence	
Transitive Property of Equality	
Transitive Property of Congruence	

Name: _____ Per: _____