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.

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| **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 |

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| The problem told meIt says so on the pictureCopied the angle measures from the problem | Given |

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

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| Multiplied the numbers on **one side**Combined like terms, keeping the same valuesSolved **one side** to get what $m∠2$ equals | Simplify |

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| Congruent angles are equal anglesEqual segments are congruent segmentsIf they’re congruent, then their sizes are equalCongruent means they’re equal | Definition of Congruence |

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| part1\_+\_part2\_=\_wholeIf you add the two parts of the segment, you’ll get all of it | Segment Addition Postulate |
| part1\_+\_part2\_=\_wholeIf you add the two angle parts, you’ll get the whole thing | Angle Addition Postulate |

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| Midpoint means part1\_$≅$\_part2If it’s a midpoint, then the parts are the sameMidpoint means 2(part)\_= wholeMidpoint means that the whole is twice as big as one part | Definition of a Midpoint |
| Bisect means part1\_$≅$\_part2If it’s a Bisector, then the parts are the sameBisect means 2(part)\_= wholeBisect means that the whole is twice as big as one part | Definition of a Bisector |

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| Vertical angles are congruentThey’re across an X from each other, so they’re congruent | Vertical Angles Theorem |
| Linear pairs add to = 180, so I added $m∠ $+$ m∠ $= 180˚They’re a linear pair, so they add to equal 180˚Linear Angle1 + Linear Angle2 = 180˚ | Linear Pair Theorem |

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| 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 |

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| Plugged *x* into the equationPlugged in$ AB=3x $& $BC=9x+1$Replaced x with what it **equals**$Replaced m∠2 with m∠3$ because they’re **equal**$Replaced RS with ST$ because they’re **equal**$Replaced \overbar{RS} with \overbar{ST}$ because they’re **congruent**$Replaced ∠2 with ∠3$ because they’re the same | Substitution |
| Switched the sides of the **=** to get *x* on the leftSwitched one side of the **equal sign** with the other | Symmetric Property of **Equality** |
| Switched the sides of the $≅$ to get $\overbar{HI}$ on the leftSwitched 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. $\overbar{GH}$ is $\overbar{GH}$ $∠LMN$ is congruent to itself ($∠LMN≅∠LMN$) | Reflexive Property of **Congruence** |

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

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| 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  |
| 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 |
| $m∠3$ is equal to $m∠3$. The angle is itself. |  | Definition of a Bisector |
| Multiplied 7 to both sides of the equation |  | Addition Property of Equality |
| Switched the sides of the equal sign |  | Definition of Congruence |
| Equal angles are congruent angles |  | Reflexive Property of Equality |
| Complementary1 + Complementary2 = 90˚ |  | Symmetric Property of Congruence |
| $\overbar{LM}$ is congruent to $\overbar{LM}$ |  | Multiplication Property of Equality |
| Added 17*x* to both sides of the equation |  | Linear Pair Theorem |
| Bisect means that 2(part) = whole |  | Division Property of Equality |
| Switched the left side of $≅$ with the right side |  | Definition of Complementary Angles |
| Linear Pair Angles add to equal 180˚ |  | Definition of a Midpoint |
| If you add the two parts of the segment, you get the whole segment |  | Symmetric Property of Equality |