Day 4 – More Complex Algebraic Justification Notes

Yesterday, you focused on justifying the solving of linear equations. Today, you are going to jump into statements that are a little more abstract and literal, but you will still use the same properties as yesterday. However it is important that you understand the difference between the Transitive Property and the Substitution Property. While they look and act very similar to each other, there is a major difference between the two:

Substitution Property	Transitive Property	Interchangeable
You will substitute a value in for PART of an equation. It is replacement of one piece of the equation. $x + y = z$ $y = c$ Result: $x + c = z$	You are replacing an ENTIRE side of an equation with another expression. It creates an entirely new equation. With the transitive property, you can think of it as there being a "middle man". $a + b = c$ $a + b = j$ Result: $c = j$	Sometimes these properties are interchangeable: $x + y = z$ $z = c$ Result: $x + y = c$

Example 1:

Given: $3a = b$, $2c = d$, $b = 2c$

Prove: $3a = d$

	Statement		Reason
1	$3a = b$	1	Given
2	$2c = d$	2	Given
3	$b = 2c$	3	Given
4	$b = d$	4	Transitive Prop (2,3) *
5	$3a = d$	5	Transitive Prop (1,4) *

* Substitution Prop would be acceptable *

Example 2:

Given: $j + k = m$, $j = 2k$, $m = p$

Prove: $p = 3k$

	Statement		Reason
1	$j + k = m$	1	Given
2	$j = 2k$	2	Given
3	$m = p$	3	Given
4	$2k + k = m$	4	Substitution (1,2)
5	$3k = m$	5	combine like terms or add
6	$3k = p$	6	transitive prop (3,5) *
7	$p = 3k$	7	Symmetric prop

* substitution would be okay *