Geometry Info Sheet #14

Example Algebraic Proofs

Write a two-column proof: If $3(x - \frac{5}{3}) = 1$, then $x = 2$.

Step #	Statement	Reason
1.	$3(x - \frac{5}{3}) = 1$	Given
2.	$3x - 3(\frac{5}{3}) = 1$	Distributive Property
3.	$3x - 5 = 1$	Simplification
4.	$3x = 6$	Addition Property
5.	$x = 2$	Division Property

Given: $\frac{7}{2} - n = 4 - \frac{1}{2}n$ **Prove**: $n = -1$

Step #	Statement	Reason	
1.	$\frac{7}{2} - n = 4 - \frac{1}{2}n$	Given	
2.	$2(\frac{7}{2} - n) = 2(4 - \frac{1}{2}n)$	Multiplication Property	
3.	$7 - 2n = 8 - n$	Distributive Property	
4.	$7 - 2n + 2n = 8 - n + 2n$	Addition Property	**These two steps could be combined into a single step.**
5.	$7 = 8 + n$	Simplification	
6.	$7 - 8 = 8 + n - 8$	Subtraction Property	**These two steps could be combined into a single step.**
7.	$-1 = n$	Simplification	
8.	$n = -1$	Symmetric Property	

Given: $y = 2x - 5$ **and** $y = x + 8$ **Prove**: $x = 13$ **and** $y = 21$

Step #	Statement	Reason
1.	$y = 2x - 5$ $y = x + 8$	Given
2.	$2x - 5 = x + 8$	Substitution Property (from step 1)
3.	$x - 5 = 8$	Subtraction Property
4.	$x = 13$	Addition Property
5.	$y = 13 + 8$	Substitution Property (from steps 1 and 4)
6.	$y = 21$	Simplification

Given: $2x - 3y = 7$ **Prove**: $y = \frac{2}{3}x - \frac{7}{3}$

Step #	Statement	Reason
1.	$2x - 3y = 7$	Given
2.	$-3y = 7 - 2x$	Subtraction Property
3.	$-\frac{1}{3}(-3y) = -\frac{1}{3}(7 - 2x)$	Multiplication Property
4.	$y = -\frac{7}{3} + \frac{2}{3}x$	Simplification & Distributive Property
5.	$y = \frac{2}{3}x - \frac{7}{3}$	Commutative Property of Addition