Geometry: Bell Work

Using what you know about algebra...

Given that $a + b = 2c$

$b = c$

Show that $a = c$

$a+b=2c$ given

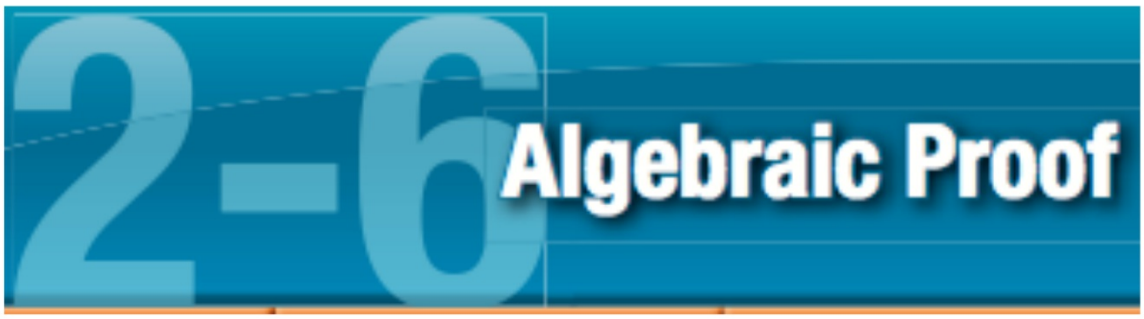
$b=c$ given

$a+c=2c$ substitution

$-c \quad -c$ subtraction

$a = c$

* Show all steps and justify what you do.



Today we will formalize algebraic proofs into 2 column proofs.

Write these in your notes

Algebraic Properties	Description
Addition Property of Equality	if $a=b$, then $a+c=b+c$
Subtraction Property of Equality	if $a=b$, then $a-c=b-c$
Multiplication Property of Equality	if $a=b$, then $a \cdot c = b \cdot c$
Division Property of Equality	if $a=b$, then $\frac{a}{c}=\frac{b}{c}$, $c \neq 0$
Reflexive Property of Equality	$a=a$
Symmetric Property of Equality	if $a=b$, then $b=a$
Transitive Property of Equality	if $a=b$ and $b=c$, then $a=c$
Substitution Property of Equality	if $a=b$, then b may be replaced by a in any equation or expression
Distributive Property	$a(b+c)=ab+ac$

Reflexive Property of Equality	$AB = AB$ $\quad m\angle 1 = m\angle 1$
Symmetric Property of Equality	if $AB = CD$, then $CD = AB$ if $m\angle 1 = m\angle 2$ then $m\angle 2 = m\angle 1$
Transitive Property of Equality	if $AB = CD$ and $CD = EF$ then $AB = EF$

Write an Algebraic Proof

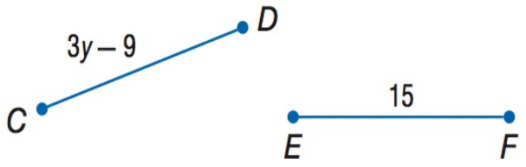
Given that 3x - 5 = 10, prove that x = 5.

steps	justification
$3x - 5 = 10$	given
$+5 \quad +5$	
$3x - 5 + 5 = 10 + 5$	Addition POE
$3x = 15$	
$\frac{3x}{3} = \frac{15}{3}$	Division POE
$x = 5$	

Write a Geometric Proof

Write a two-column proof to verify each conjecture.

If $\overline{CD} \cong \overline{EF}$, then $y = 8$.



Statements	Justifications
$\overline{CD} \cong \overline{EF}$	given
$CD = 3y - 9$	given
$EF = 15$	given
$CD = EF$	definition of congruent
$3y - 9 = 15$	Substitution POE
$+9 \quad +9$	addition POE
$3y = 24$	
$\frac{3y}{3} = \frac{24}{3}$	division POE
$y = 8$	

Complete the following proof.

Given: $\frac{y+2}{3} = 3$

Prove: $y = 7$

Proof:

Statements	Reasons
a. ? $\frac{y+2}{3} = 3$	a. Given
b. $3\left(\frac{y+2}{3}\right) = 3(3)$	b. ? multiplication PoE
c. $y+2-2=9-2$	c. ? subtraction PoE
d. $y = 7$	d. Subtraction Property

Given:	$2x = g$ $x = 2y$ $g = f$
Prove:	$4y = f$

	Statement	Justification
1		
2		
3		
4	$2(2y) = g$	sub
5	$4y = g$	mult
6	$4y = f$	sub
7		
8		
9		
10		
11		
12		
13		

Assignment:

Pg 158-161 #1-13, 18-20, 24-35