

Geometry: Bell Work

Using what you know about algebra...

Given that $\mathbf{a + b = 2c}$
 $\mathbf{b = c}$

$$\begin{array}{l} a+b=2c \\ b=c \\ a+c=2c \\ -c \quad -c \\ \hline a=c \end{array}$$

given
given
substitution
subtraction

Show that $\mathbf{a = c}$

$$a=c$$

* Show all steps and justify what you do.

2-6 Algebraic Proof

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 a may be replaced by b in any equation or expression
Distributive Property	$a(b+c) = ab+ac$

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

if $m\angle 1 = m\angle 2$ and $m\angle 2 = m\angle 3$
then $m\angle 1 = m\angle 3$

Write an Algebraic Proof

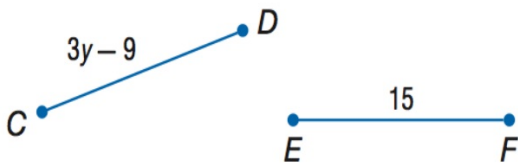
Given that $3x - 5 = 10$, prove that $x = 5$.

steps	justification
$3x - 5 = 10$	given
$3x - 5 + 5 = 10 + 5$	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 $y = 8$.



statement	justification
$\overline{CD} \cong \overline{EF}$	given
$CD = 3y - 9$	given
$EF = 15$	given
$CD = EF$	definition of congruence
$3y - 9 = 15$	substitution POE
$3y - 9 + 9 = 15 + 9$	addition POE
$\frac{3y}{3} = \frac{24}{3}$	division POE
$y = 8$	

Complete the following proof.

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

Prove: $y = 7$

Proof:

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

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

	Statement	Justification
1	$2x = g$	given
2	$x = 2y$	given
3	$g = f$	given
4	$2(2y) = g$	substitution POE
5	$4y = g$	
6	$4y = f$	substitution POE
7		
8		
9		
10		
11		
12		
13		

Assignment:

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