

Geometry: Bell Work

Using what you know about algebra...

Given that $a + b = 2c$
 $b = c$

Show that $a = c$

statements	justifications
$a + b = 2c$	given
$b = c$	given
$a + c = 2c$	substitution
$\quad -c \quad -c$	subtraction
$a = c$	

* 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 can replace b in any equation or expression
Distributive Property	$a(b+c) = a \cdot b + a \cdot c$

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

Write an Algebraic Proof

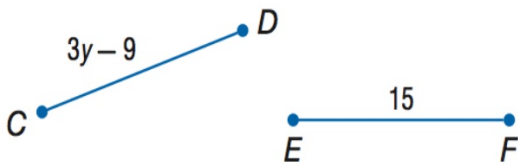
Given that $3x - 5 = 10$, prove that $x = 5$.

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 $y = 8$.



statements	justification
$\overline{CD} \cong \overline{EF}$	given
$CD = 3y - 9$	given
$EF = 15$	given
$CD = EF$	definition of congruence
$3y - 9 = 15$	substitution POE
$\begin{array}{r} 3y - 9 = 15 \\ + 9 \quad + 9 \\ \hline 3y = 24 \end{array}$	addition POE
$\begin{array}{r} 3y = 24 \\ \div 3 \quad \div 3 \\ \hline y = 8 \end{array}$	division POE

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 PE
5	$4y = g$	mult.
6	$4y = f$	substitution
7		
8		
9		
10		
11		
12		
13		

Assignment:

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