ALGEBRAIC PROOF

- to review the properties of equality and use them to write algebraic proofs
- to identify properties of equality and congruence

OBJECTIVE

Properties of	Equality:
Addition Property	If a = b, then a+c = b+c
Subtraction Property	If a = b, then a-c = b-c
Multiplication Property	If a = b, then a•c = b•c
Division Property	If a = b, then a÷c = b÷c
Reflexive Property	a = a
Symmetric Property	If a = b, then b = a
Transitive Property	If a=b and b=c then a=c
Substitution Property	If a =b , then b can be substituted for a in any expression

KEY CONCEPTS

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The Distributive	Property:
Sum:	a(b + c) = ab + ac
Difference:	a(b – c) = ab – ac

Properties of	Congruence:
Reflexive Property	$\overline{AB} \cong \overline{AB}; \quad \angle A \cong \angle A$
Symmetric Property	$If\ \overline{AB} \cong \overline{CD}, then\ \overline{CD} \cong \overline{AB}$ $If \angle A \cong \angle B, then\ \angle B \cong \angle A$
Transitive Property	$If\ \overline{AB} \cong \overline{CD}, and\ \overline{CD} \cong \overline{EF},$ then $\overline{AB} \cong \overline{EF}$ (also for angles)

CLASS WORK

Solve each equation. Write a justification for each step.

2. $6r - 3 = -2(r + 1)$

$6r - 3 = -2(r + 1)$	Given
$6r - 3 = -2r - 2$	Distrib. Prop.
$8r - 3 = -2$	Add. Prop. of =
$8r = 1$	Add. Prop. of =
$r = \dfrac{1}{8}$	Div. Prop. of =

Write a justification for each step to solve for x.
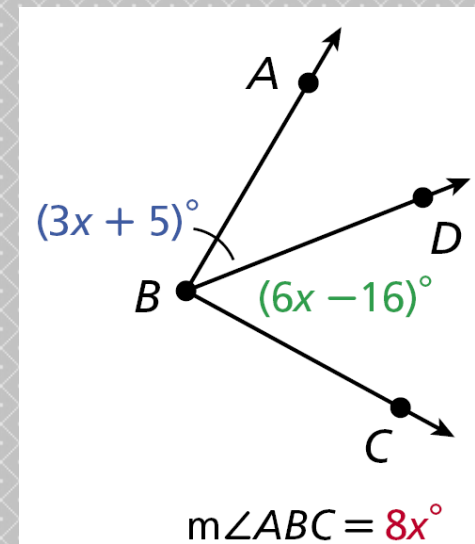
m∠ABC = m∠ABD + m∠DBC   ∠ Add. Post.

$8x° = (3x + 5)° + (6x − 16)°$ Subst. Prop. of Equality

$8x = 9x − 11$ CLT/Dist. Prop./Simplify

$−x = −11$ Subtr. Prop. of Equality.

$x = 11$ Div. Prop. of Equality.

CLASS WORK

1. Identify the property that justifies the statement:
$\angle DEF \cong \angle DEF$

2. Solve the equation. Write a justification for each step. $3(m + 4) = -m$
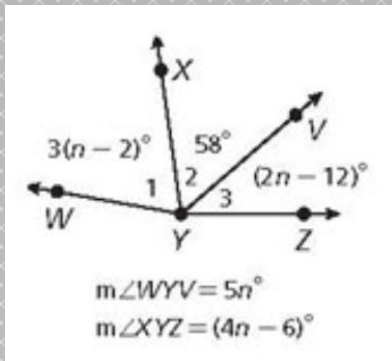
3. Write a justification for each step.
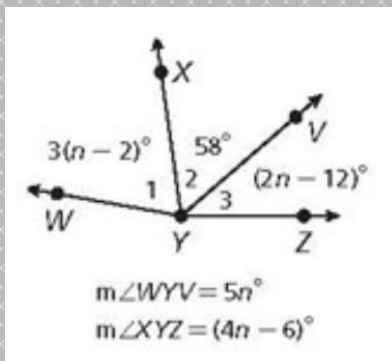
$$m\angle XYZ = m\angle 2 + m\angle 3$$
$$4n - 6 = 58 + (2n - 12)$$
$$4n - 6 = 2n + 46$$
$$2n - 6 = 46$$
$$2n = 52$$
$$n = 26$$

CLASS WORK

1. Identify the property that justifies the statement: $\angle DEF \cong \angle DEF$ **Reflexive Property of Congruence**

2. Solve the equation. Write a justification for each step. $3(m + 4) = -m$ **given**

    $3m + 12 = -m$ **distributive property**
    $3m = -m - 12$ **subtraction property of =**
    $4m = -12$ **addition property of =**
    $m = -3$ **division property of =**

3. Write a justification for each step.

$m\angle XYZ = m\angle 2 + m\angle 3$ **Angle addition postulate**
$4n - 6 = 58 + (2n - 12)$ **Substitution Property**
$4n - 6 = 2n + 46$ **CLT**
$2n - 6 = 46$ **Subtraction Property of =**
$2n = 52$ **Addition Property of =**
$n = 26$ **Division Property of =**

CLASS WORK

SUMMARY

- There are reasons or justifications for every statement made in Algebra and Geometry

- We use these reasons to logically proceed from one statement to the next

LEARNING RUBRIC

- Got It: Solves and justifies equations
- Almost There: Fills in the blanks for an algebraic proof
- Moving Forward: Identifies the justification for writing own equations
- Getting Started: Identifies the justification for algebraic operations

HOMEWORK

- Pages 108-109: 16; 22-34 even; 40, 42