Section Overview

Professional Development

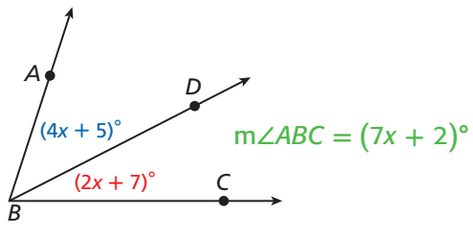
Algebraic Proof — Lesson 2-5

Why? Algebraic properties will be used as justifications in many of the geometric proofs throughout this course.

Properties of Equality

	If $a = b$, then…		
Addition Property	$a + c = b + c$	**Reflexive Property**	$a = a$
Subtraction Property	$a - c = b - c$	**Symmetric Property**	If $a = b$, then $b = a$.
Multiplication Property	$ac = bc$	**Transitive Property**	If $a = b$ and $b = c$, then $a = c$.
Division Property	$\frac{a}{c} = \frac{b}{c}$, $c \neq 0$	**Substitution Property**	If $a = b$, then b can be substituted for a in any expression.

Solving an equation is like writing a type of proof—an algebraic proof. The properties of equality are used to justify each step of the solution.



$m\angle ABC = m\angle ABD + m\angle DBC$	Angle Addition Postulate
$7x + 2 = (4x + 5) + (2x + 7)$	Substitution Property of Equality
$7x + 2 = 6x + 12$	Simplify.
$x + 2 = 12$	Subtraction Property of Equality
$x = 10$	Subtraction Property of Equality

$$m\angle ABD = (4x + 5)° = [4(10) + 5]° = 45°$$
$$m\angle DBC = (2x + 7)° = [2(10) + 7]° = 27°$$
$$m\angle ABC = (7x + 2)° = [7(10) + 2]° = 72°$$

Geometric Proof — Lessons 2-6, 2-7

Why? Proofs are used to establish the validity of geometric relationships by using deductive reasoning in a format other people can follow.

When writing a geometric proof, you can use the following as justifications:

- definitions
- postulates
- theorems
- properties
- given information

This chapter covers three styles, or formats, for geometric proofs.

Two-Column Proof
The steps are listed in the left column, and the corresponding reasons are listed in the right column.

Flowchart Proof
Boxes and arrows show the structure of the proof. Arrows connect the boxes and indicate the logical flow.

Paragraph Proof
The steps and their reasons are written as sentences in a paragraph.