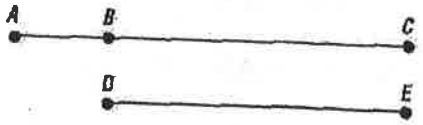
NAME _____ DATE _____

2-6 Reteaching Worksheet

Two-Column Proofs with Segments

Proofs in geometry follow the same format that you used in Lesson 2–4. The steps in a two-column proof are arranged in a step-by-step order so that each step follows logically from the preceding one. The reasons can be given information, definitions, postulates of geometry, or rules of algebra. You may also use information that it is safe to assume from a given figure.

1 Write a two-column proof.
Given: $\overline{BC} \cong \overline{DE}$
Prove: $AC = AB + DE$



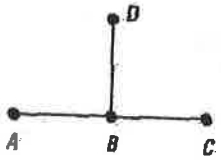
Statements	Reasons
a. $\overline{BC} \cong \overline{DE}$	a. Given
b. $BC = DE$	b. Def. of $\cong$ segments
c. $AC = AB + BC$	c. Segment addition postulate
d. $AC = AB + DE$	d. Substitution Property

Complete each proof by naming the property that justifies each statement.

2. Given: M is the midpoint of $\overline{AB}$.
B is the midpoint of $\overline{MD}$.
Prove: $MD = 2MB$

Statements	Reasons
a. M is the midpoint of $\overline{AB}$. B is the midpoint of $\overline{MD}$.	a. Given
b. $\overline{AM} \cong \overline{MB}$ b.1 $AM = MB$; $\overline{MB} \cong \overline{BD}$ $MB = BD$	b. Def. of Midpt b.1 Def of $\cong$ segments
c. $MD = MB + BD$	c. Segment Addition Postulate
d. $MD = MB + MB$	d. Substitution
e. $MD = 2MB$	e. Substitution

3. Given: A, B, and C are collinear,
$AB = BD$
$BD = BC$
Prove: B is the midpoint of $\overline{AC}$.



Statements	Reasons
a. A, B, and C are collinear, $AB = BD$ $BD = BC$	a. Given
b. $AB = BC$ b.1 $\overline{AB} \cong \overline{BC}$	b. Transitive/Substitution b.1 Def of $\cong$ segments
c. B is the midpoint of $\overline{AC}$.	c. Def of Midpt.

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2-6 Practice Worksheet

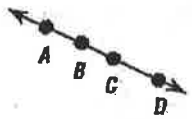
Two-Column Proofs with Segments

Complete each proof.

1. Given: $AD = 2AB + BC$
   Prove: $\overline{AB} \cong \overline{CD}$

Statements	Reasons
a. $AD = 2AB + BC$	a. Given
b. $AD = AB + BC + CD$	b. Segment Addition Postulate
c. $2AB + BC = AB + BC + CD$	c. Substitution
c.1 $AB = AB$; $BC = BC$	c.1 Reflexive
d. $AB = CD$	d. Subtraction
e. $\overline{AB} \cong \overline{CD}$	e. Def of $\cong$ segments

2. Given: B is between A and D.
   C is between A and D.
   Prove: $AB + BD = AC + CD$



Statements	Reasons
a. B is between A and D. C is between A and D.	a. Given
b. $AB + BD = AD$	b. Segment Addition Postulate
c. $AC + CD = AD$	c. Segment Addition Postulate
d. $AD = AC + CD$ (not really needed)	d. Symmetric
e. $AB + BD = AC + CD$	e. Substitution

Write a two-column proof.

3. Given: B is the midpoint of $\overline{AC}$.
   Prove: $\overline{AB} + CD = BD$

Statements	Reasons
1) B is the midpt of $\overline{AC}$	1) Given
2) $\overline{AB} \cong \overline{BC}$	2) Def of Midpt
3) $AB = BC$	3) Def of $\cong$ segments
4) $BC + CD = BD$	4) Segment Addition
5) $AB + CD = BD$	5) Substitution

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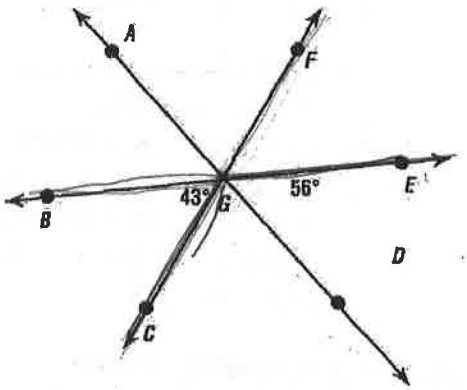
2-7

Practice Worksheet

Two-Column Proof with Angles

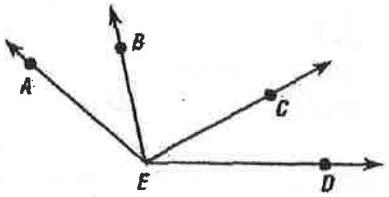
Complete each statement if m∠BGC = 43 and m∠DGE = 56.

1. $\angle FGA \cong$? ∠CGD or ∠FGE or ∠CGB
2. $\angle BGF$ and ? are supplementary.
3. $m\angle CGD =$? 81
4. $m\angle AGF =$? 81 ∠BGC or ∠EGF
5. $\angle EGC$ and ? are supplementary.
6. $m\angle AGB =$? 56
7. $m\angle AGC =$? 99



Write a two-column proof.

8. Given: $\angle AEC \cong \angle DEB$
   Prove: $\angle AEB \cong \angle DEC$



Statements	Reasons
1) ∠AEC ≅ ∠DEB	1) GIVEN
2) ∠AEB + ∠BEC = ∠AEC ∠DEC + ∠BEC = ∠DEB	2) Angle Addition Postulate
3) ∠AEB + ∠BEC = ∠DEC + ∠BEC	3) Substitution
4) ∠AEB = ∠DEC	4) Subtraction
5) ∠AEB ≅ ∠DEC	5) Def of ≅ angles

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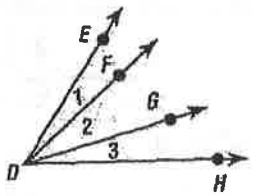
2-7

Reteaching Worksheet

Two-Column Proofs with Angles

Many relationships involving angles can be proved by applying the rules of algebra, as well as the definitions and postulates of geometry.

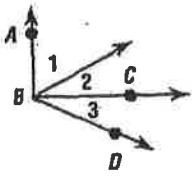


Example: Given: $\angle EDG \cong \angle FDH$
Prove: $m\angle 1 = m\angle 3$

Statements	Reasons
a. $\angle EDG \cong \angle FDH$	a. Given
b. $m\angle EDG = m\angle FDH$	b. Definition of congruent angles
c. $m\angle EDG = m\angle 1 + m\angle 2$ $m\angle FDH = m\angle 2 + m\angle 3$	c. Angle addition postulate
d. $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	d. Substitution property of equality
e. $m\angle 1 = m\angle 3$	e. Subtraction property of equality

Complete the following proof.

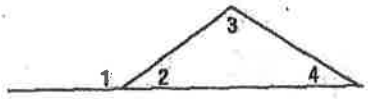
1. Given: $\overline{AB} \perp \overline{BC}$
$m\angle 2 = m\angle 3$
Prove: $m\angle 1 + m\angle 3 = 90$



Statements	Reasons
a. $\overline{AB} \perp \overline{BC}$ $m\angle 2 = m\angle 3$	a. Given
b. ABC is a right angle	b. Def of $\perp$
c. $m\angle ABC = 90$	c. Def of Right $\angle$
d. $m\angle ABC = m\angle 1 + m\angle 2$	d. Angle Addition Postulate
e. $m\angle 1 + m\angle 2 = 90$	e. Substitution Property
f. $m\angle 1 + m\angle 3 = 90$	f. Substitution Property

Write a two-column proof.

2. Given: $\angle 1$ and $\angle 2$ form a linear pair.
$m\angle 2 + m\angle 3 + m\angle 4 = 180$
Prove: $m\angle 1 = m\angle 3 + m\angle 4$



Statements	Reasons
a. $\angle 1$ and 2 form a linear pair. $m\angle 2 + m\angle 3 + m\angle 4 = 180$	a. Given
b. $\angle 1$ and $\angle 2$ are supplementary.	b. Def of linear pair
c. $m\angle 1 + m\angle 2 = 180$	c. Supplement Thm.
d. $m\angle 1 + m\angle 2 =$ $m\angle 2 + m\angle 3 + m\angle 4$ d.1 $m\angle 2 = m\angle 2$	d. Substitution Property d.1 Reflexive Property
e. $m\angle 1 = m\angle 3 + m\angle 4$	e. Subtraction Property