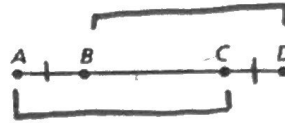


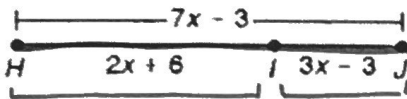
2.9 Guided Practice – Geometric Proofs

If  $A, B, C,$  and  $D$  are collinear, as shown in the figure, with  $AC = BD$ , then  $AB = CD$ . Complete the proof by writing the missing statements or reasons.



Given:  $AC = BD$   
 Prove:  $AB = CD$

Statements	Reasons
1. $AC = BD$	1. Given
2. $AC = \underline{AB + BC}$ ; $BD = \underline{BC + CD}$	2. <u>Segment Add. post.</u>
3. $AB + BC = BC + CD$	3. Substitution Property of Equality
4. $AB = CD$	4. <u>Subtraction P.O.E</u>



$HJ = HI + IJ$

$7x - 3 = (2x + 6) + (3x - 3)$

$7x - 3 = 5x + 3$

$7x = 5x + 6$

$2x = 6$

$x = 3$

Segment Add. post  
Substitution prop.  
Combine like terms  
Add. P.O.E  
Subtraction P.O.E  
Division P.O.E

Fill in the blanks to complete the two-column proof.

Given:  $\angle HKJ$  is a straight angle. ✓  
 $KI$  bisects  $\angle HKJ$ .  
 Prove:  $\angle IKJ$  is a right angle.  
 Proof:

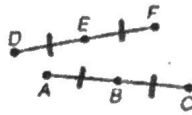


Statements	Reasons
1. a. <u><math>\angle HKJ</math> is a straight <math>\angle</math></u>	1. Given
2. $m\angle HKJ = 180^\circ$	2. b. <u>Def. of straight <math>\angle</math></u>
3. c. <u><math>KI</math> bisect <math>\angle HKJ</math></u>	3. Given
4. $\angle IKJ \cong \angle IKH$	4. Def. of $\angle$ bisector
5. $m\angle IKJ = m\angle IKH$	5. Def. of $\cong$
6. d. <u><math>\angle IKH + \angle IKJ = \angle HKJ</math></u>	6. $\angle$ Add. Post.
7. $2m\angle IKJ = 180^\circ$	7. e. Subst. ( <u>Step 6</u> )
8. $m\angle IKJ = 90^\circ$	8. Div. Prop. of =
9. $\angle IKJ$ is a right angle.	9. f. <u>def. of right <math>\angle</math></u>

## 2.9 Guided Practice – Geometric Proofs

Write a justification for each step.

Given:  $AB = EF$ ,  $B$  is the midpoint of  $\overline{AC}$ ,  
and  $E$  is the midpoint of  $\overline{DF}$ .



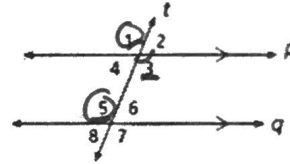
1.  $B$  is the midpoint of  $\overline{AC}$ ,  
and  $E$  is the midpoint of  $\overline{DF}$ .
2.  $\overline{AB} \cong \overline{BC}$ , and  $\overline{DE} \cong \overline{EF}$ .
3.  $AB = BC$ , and  $DE = EF$ .
4.  $AB + BC = AC$ , and  $DE + EF = DF$ .
5.  $2AB = AC$ , and  $2EF = DF$ .
6.  $AB = EF$
7.  $2AB = 2EF$
8.  $AC = DF$
9.  $\overline{AC} \cong \overline{DF}$

Given  
 Def. of midpoint  
 Def. of  $\cong$   
 Seg. Add. post  
 Substitution Prop.  
 Division POE  
 mult. POE  
 Substitution POE  
 Def. of  $\cong$

If two parallel lines are cut by a transversal, then the pairs of corresponding angles have the same measure.

Given:  $p \parallel q$

Prove:  $m\angle 1 = m\angle 5$



Complete the proof by writing the missing reasons.

Statements	Reasons
1. $p \parallel q$	1. Given
2. $m\angle 3 = m\angle 5$	2. Alt. int $\angle$ 's
3. $m\angle 1 = m\angle 3$	3. Vertical $\angle$ 's are $\cong$
4. $m\angle 1 = m\angle 5$	4. Transitive prop. / Substitution

MCCS-12.G.CO.9

**PROOF**

Common Segments Theorem

If  $A$ ,  $B$ ,  $C$ , and  $D$  are collinear, as shown in the figure, with  $AB = CD$ , then  $AC = BD$ .

Given:  $AB = CD$

Prove:  $AC = BD$



A Complete the two-column proof.

Statements	Reasons
1. $AB = CD$	1. Given
2. $BC = BC$	2. Reflexive Prop.
3. $\boxed{AB} + BC = \underline{BC} + \boxed{CD}$	3. Addition POE
4. $AB + BC = AC$ ; $BC + CD = BD$	4. Seg. add post.
5. $AC = BD$	5. Substitution Prop.