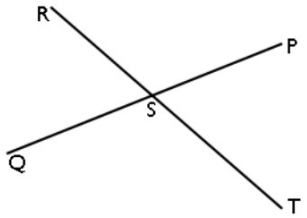
Geometric Proofs
Day 2

Section 2.6

Given: $\overline{RT}$ and $\overline{PQ}$ intersecting at S so that $RS = PS$ and $ST = SQ$

Prove: $RT = PQ$



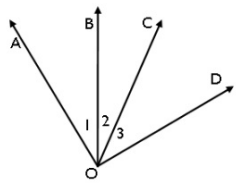
Proof:

	STATEMENTS		REASONS
1)	RS=PS and ST = SQ	1)	
2)	RS + ST = PS + SQ	2)	
3)	RS + ST = RT QS +SP = QP	3)	
4)	RT = PQ	4)	

Given: $m(\angle AOC) = m(\angle BOD)$

Prove: $m(\angle 1) = m(\angle 3)$

Proof:

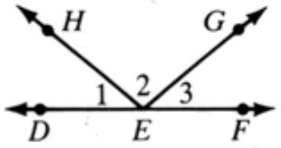


STATEMENT	REASONS
1) $m\angle AOC = m\angle BOD$	1)
2) $m\angle AOC = m\angle 1 + m\angle 2$ $m\angle BOD = m\angle 2 + m\angle 3$	2)
3)	3) Substitution
4) $m\angle 2 = m\angle 2$	4)
5) $m\angle 1 = m\angle 3$	5)

Example Complete the proof by supplying the missing statements and reasons.

Given: $m\angle 1 = m\angle 3$

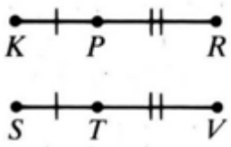
Prove: $m\angle DEG = m\angle HEF$



Statements	Reasons
1)	1. Given
2) $m\angle 2 = m\angle 2$	2.
3) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	3.
4) $m\angle DEG = m\angle 1 + m\angle 2$; $m\angle HEF = m\angle 3 + m\angle 2$	4.
5) $m\angle DEG = m\angle HEF$	5.

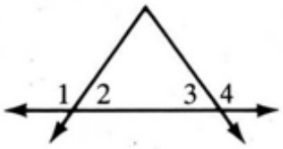
Complete the following proofs by supplying the missing statements and reasons.

6. Given: $KP = ST$;
$PR = TV$
Prove: $KR = SV$



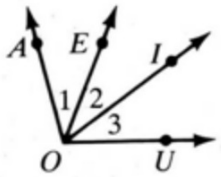
Statements	Reasons
1)	1. Given
2) $KP + PR = ST + TV$	2.
3) $KP + PR = KR$; $ST + TV = SV$	3.
4)	4. Substitution Prop.

7. Given: $m\angle 1 = m\angle 4$
Prove: $m\angle 2 = m\angle 3$



Statements	Reasons
1) $m\angle 1 + m\angle 2 = 180$; $m\angle 3 + m\angle 4 = 180$	1. Angle Addition Post.
2) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	2.
3)	3. Given
4) $m\angle 2 = m\angle 3$	4.

8. Given: $m\angle AOI = m\angle EOU$
Prove: $m\angle 1 = m\angle 3$

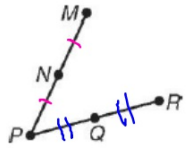


Statements	Reasons
1)	1. Given
2) $m\angle 2 = m\angle 2$	2.
3) $m\angle 1 + m\angle 2 = m\angle AOI$; $m\angle 2 + m\angle 3 = m\angle EOU$	3.
4) $m\angle 1 + m\angle 2 = m\angle 2 + m\angle 3$	4.
5)	5.

Name: HW 2.6b WS-Day 2 Date: _____ Period: _____ Assignment #: _____

SECTION 2.6 WORKSHEET – DAY 2

1) Write a justification for each step.



Given: N is the midpoint of $\overline{MP}$, Q is the midpoint of $\overline{RP}$, and $\overline{PQ} \cong \overline{NM}$.

Prove: $\overline{PN} \cong \overline{QR}$

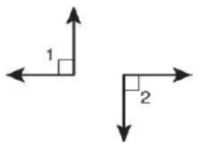
Proof:

1.	N is the midpoint of $\overline{MP}$.	1. Given
2.	Q is the midpoint of $\overline{RP}$.	2. Given
3.	$\overline{PN} \cong \overline{NM}$	3. Def MP
4.	$\overline{PQ} \cong \overline{NM}$	4. Given
5.	$\overline{PN} \cong \overline{PQ}$	5. Substit.
6.	$\overline{PQ} \cong \overline{QR}$	6. Def MP
7.	$\overline{PN} \cong \overline{QR}$	7. Transitive POE

1 ≅ 2
2 ≅ 3 → 1 ≅ 3

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

2. **Given:** ∠1 and ∠2 are right angles.



Prove: ∠1 ≅ ∠2

Proof:

Statements	Reasons
1. a. m∠1 and ∠2 are rt. ∠s	1. Given
2. m∠1 = 90°	2. b. def rt ∠
3. c. m∠2 = 90	3. Definition of right angle
4. m∠1 = m∠2	4. d. SUBStit.
5. e. ∠1 ≅ ∠2	5. Definition of congruent angles

a = b

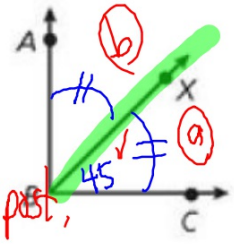
c = b

a = c

3)

Write a justification for each step, given that $\overrightarrow{BX}$ bisects $\angle ABC$ and $m\angle XBC = 45°$.

1. $\overrightarrow{BX}$ bisects $\angle ABC$. Given
2. $\angle ABX \cong \angle XBC$ def ∠ Bisector
3. $m\angle ABX = m\angle XBC$ def of ≅
4. $m\angle XBC = 45°$ Given
5. $m\angle ABX = 45°$ substit.
6. $m\angle ABX + m\angle XBC = m\angle ABC$ ∠ add post.
7. $45° + 45° = m\angle ABC$ substit.
8. $90° = m\angle ABC$ simplify
9. $\angle ABC$ is a right angle. def ∟



a = b

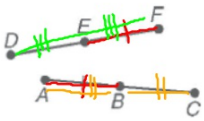
a = 45 subst.

b = 45

≅ = def of congruence

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. $\overline{AC} \cong \overline{DF}$

1 Given
2 Def of Midpoint
3 Def of congruence
4 seg. add post
5 Substit.
6 Given
7 mult POE
8 Subst.
9 Def of congruence

$x = y$

$2x = 2y$

$AB + BC = AC$

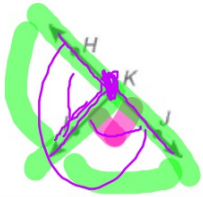
AB

$2AB = AC$

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

10. **Given:** $\angle HKJ$ is a straight angle.
$\overline{KI}$ bisects $\angle HKJ$.
Prove: $\angle IKJ$ is a right angle.

Proof:



Statements	Reasons
1. a. $\angle HKJ$ is straight	1. Given
2. $m\angle HKJ = 180°$	2. b. DEF STR $\angle$
3. c. $\overline{KI}$ BISECTS $\angle HKJ$	3. Given
4. $\angle IKJ \cong \angle IKH$	4. Def. of $\angle$ bisector
5. $m\angle IKJ = m\angle IKH$	5. Def. of $\cong$ $\measuredangle$s
6. d. $\angle IKJ + \angle IKH = \angle HKJ$	6. $\angle$ Add. Post.
7. $2m\angle IKJ = 180°$	7. e. Subst. (Steps 4 and 6 and 2
8. $m\angle IKJ = 90°$	8. Div. Prop. of =
9. $\angle IKJ$ is a right angle.	9. f. DEF $\perp$