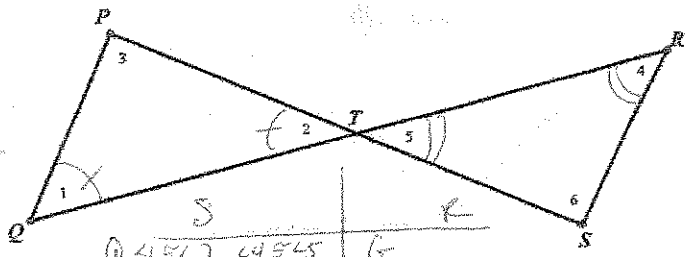
3.4 - Parallel Lines Proofs Practice – Worksheet #2

1. Given: $\angle 1 \cong \angle 2; \angle 4 \cong \angle 5$

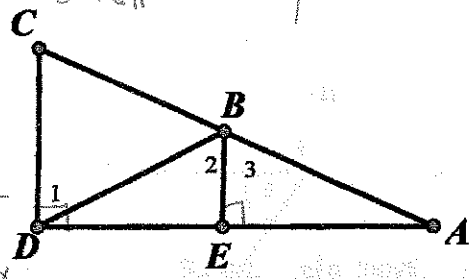
   Prove: $\overline{PQ} \parallel \overline{RS}$



S	R
① $\angle 1 \cong \angle 2, \angle 4 \cong \angle 5$	① Given
② $\angle 2 \cong \angle 5$	② VAT
③ $\angle 5 \cong \angle 4$	③ Symmetric
④ $\angle 1 \cong \angle 4$	④ Trans.
⑤ $\overline{PQ} \parallel \overline{RS}$	⑤ Converse of Alt. Int. $\angle$s Thm

2. Given: $\overline{BE} \perp \overline{DA}$, $\overline{CD} \perp \overline{DA}$

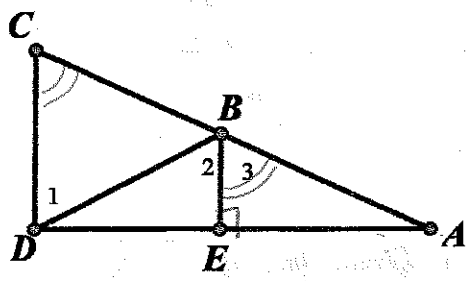
   Prove: $\angle 1 \cong \angle 2$



S	R
① $\overline{BE} \perp \overline{DA}, \overline{CD} \perp \overline{DA}$	① Given
② $\angle BEA$ and $\angle CDE$ rt $\angle$s	② Def. $\perp$
③ $m\angle BEA = 90, m\angle CDE = 90$	③ Def. rt $\angle$s
④ $m\angle BEA = m\angle CDE$	④ Subst.
⑤ $\angle BEA \cong \angle CDE$	⑤ Defn. $\cong$
⑥ $\overline{CD} \parallel \overline{BE}$	⑥ Conv. of corresp $\angle$s
⑦ $\angle 1 \cong \angle 2$	⑦ alt. int $\angle$s Thm

3. Given: $\angle C \cong \angle 3$, $\overline{BE} \perp \overline{DA}$

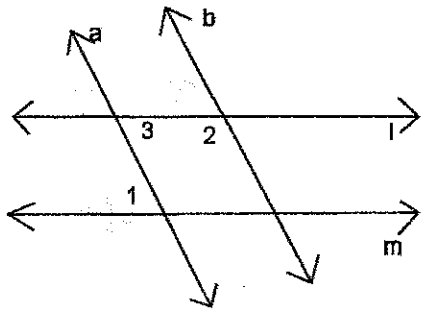
   Prove: $\overline{CD} \perp \overline{DA}$



S	R
① $\angle C \cong \angle 3$	① Given
② $\overline{CD} \parallel \overline{BE}$	② Conv. Corresp. $\angle$s Thm
③ $\angle BEA \cong \angle CDE$	③ Corresp. $\angle$s Thm
④ $\overline{BE} \perp \overline{DA}$	④ Given
⑤ $\angle BEA$ is rt $\angle$	⑤ Def $\perp$
⑥ $m\angle BEA = 90$	⑥ def rt $\angle$s
⑦ $m\angle BEA = m\angle CDE$	⑦ Defn. $\cong$
⑧ $m\angle CDE = 90$	⑧ Substn.
⑨ $\angle CDE$ is rt $\angle$	⑨ Defn. rt. $\angle$
⑩ $\overline{CD} \perp \overline{DA}$	⑩ Defn. $\perp$

4. Given $l \| m$; $\angle 1$ and $\angle 2$ are supplementary

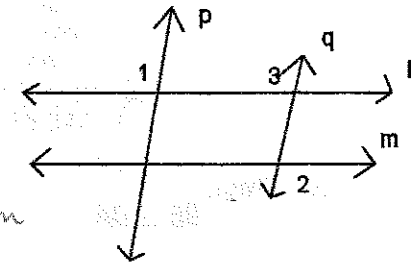
Prove: $a \| b$



S	R
1) $l \| m$	1) G
2) $\angle 1 \cong \angle 3$	2) alt. int $\measuredangle$s Thm
3) $m\angle 1 = m\angle 3$	3) Defn. $\cong$
4) $\angle 1$ & $\angle 2$ suppl.	4) Given
5) $m\angle 1 + m\angle 2 = 180$	5) Defn. supple.
6) $m\angle 3 + m\angle 2 = 180$	6) Substit.
7) $\angle 3$ & $\angle 2$ are supple.	7) defn. supplem.
8) $a \| b$	8) Conv. of SSI $\measuredangle$s Thm

5. Given: $p \| q$; $\angle 1 \cong \angle 2$

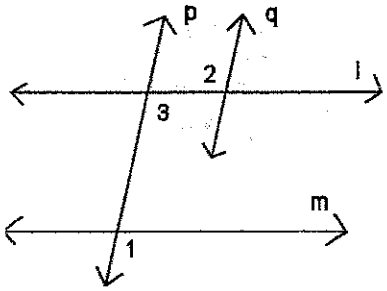
Prove: $l \| m$



S	R
① $p \| q$	① G
② $\angle 3 \cong \angle 1$	② Corresp. $\measuredangle$ Thm
③ $\angle 1 \cong \angle 2$	③ Given
④ $\angle 3 \cong \angle 2$	④ Trans.
⑤ $l \| m$	⑤ Conv. of alt. ext. $\measuredangle$s Thm.

6. Given: $l \| m$; $p \| q$

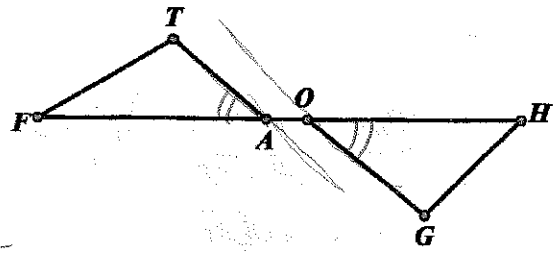
Prove: $\angle 1 \cong \angle 2$



S	R
① $l \| m$	① G
② $\angle 1 \cong \angle 3$	② Corresp $\measuredangle$ Post.
③ $p \| q$	③ G
④ $\angle 3 \cong \angle 2$	④ alt. int $\measuredangle$ Thm
⑤ $\angle 1 \cong \angle 2$	⑤ Transitive

7. Given: $\angle FAT \cong \angle HOG$

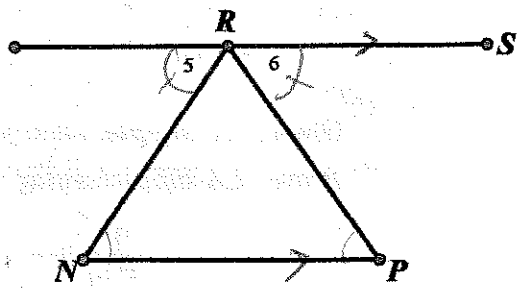
Prove: $\overline{AT} \parallel \overline{GO}$



S	R
① $\angle FAT \cong \angle HOG$	① Given
② $\overline{AT} \parallel \overline{GO}$	② ~~alt. int. ∠s~~ Converse of alt. ext. ∠ Thm

8. Given: $\angle 5 \cong \angle 6$; $\overline{RS} \parallel \overline{NP}$

Prove: $\angle RNP \cong \angle RPN$



S	R
① $\overline{RS} \parallel \overline{NP}$	① Given
② $\angle RNP \cong \angle 5$	② alt. int ∠ Thm
③ $\angle 5 \cong \angle 6$	③ G
④ $\angle 6 \cong \angle RPN$	④ alt. int ∠ Thm
⑤ $\angle RNP \cong \angle RPN$	⑤ Transitive

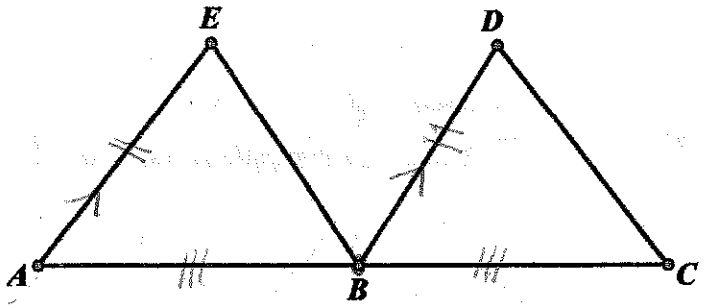
9. *Given:* $\overline{EA} \parallel \overline{DB}$

$\overline{EA} \cong \overline{DB}$

B is the midpoint of $\overline{AC}$

Prove: $\overline{EB} \parallel \overline{DC}$

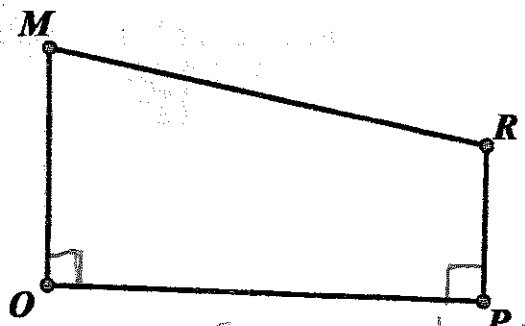
need $\cong \triangle$s?



10. *Given : ∠MOP is a right angle*

$\overline{OP} \perp \overline{RP}$

Prove : $\overline{MO} \parallel \overline{RP}$



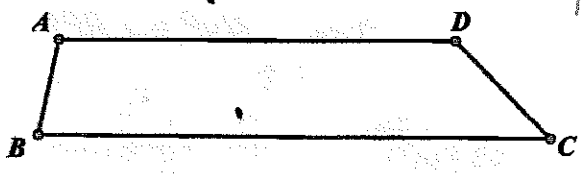
S	R
① ∠MOP is rt ∠ $\overline{OP} \perp \overline{RP}$	① G
② ∠RPO is rt ∠	② Defn. ⊥
③ m∠MOP=90, m∠RPO=90	③ Defn. rt ∠
④ m∠MOP + m∠RPO = 90+90	④ add prop. =
⑤ m∠MOP + m∠RPO = 180	⑤ Sbstn
⑥ ∠MOP & ∠RPO are supp.	⑥ Defn. supple.
⑦ $\overline{MO} \parallel \overline{RP}$	⑦ Conv. of SSI ∠ Thm

Alt

S	R
① ∠MOP is rt ∠	① G
② $\overline{MO} \perp \overline{OP}$	② defn. ⊥
③ $\overline{OP} \perp \overline{RP}$	③ Given
④ $\overline{MO} \parallel \overline{RP}$	④ 2 lines ⊥ to same line are ∥ to each other

11. *Given : ∠C supplementary to ∠D*

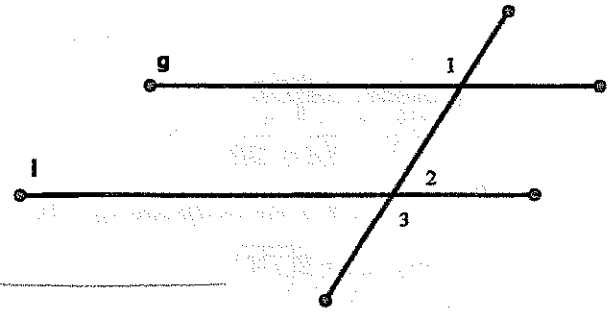
Prove: ∠A supplementary to ∠B



S	R
① ∠C supplem. to ∠D	① Given
② $\overline{AD} \parallel \overline{BC}$	② Conv. of SSI ∠ Thm.
③ ∠A supple. to ∠B	③ SSI ∠ Thm

12. *Given : g ∥ l*

Prove : ∠1 is supplementary to ∠2

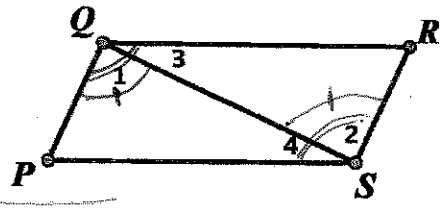


S	R
① g ∥ l	① G
② ∠1 ≅ ∠3	② Alt ext. ∠ Thm
③ ∠2 is supple. to ∠3	③ LPP
④	

Given : $\angle 1 \cong \angle 2$

13. $\angle PQR \cong \angle RSP$

Prove: PQRS is a parallelogram



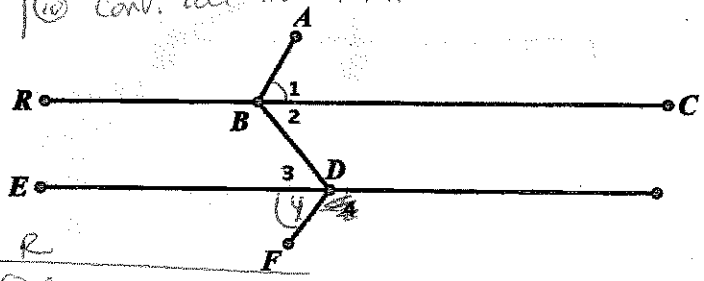
S	R
(1) $\angle 1 \cong \angle 2$, $\angle PQR \cong \angle RSP$	(1) Given
(2) $\overline{PQ} \parallel \overline{SR}$	(2) Conv. of alt. int. $\angle$ Thm
(3) $m\angle 1 = m\angle 2$	(3) Defn. $\cong$
(4) $m\angle PQR = m\angle 1 + m\angle 3$ $m\angle RSP = m\angle 2 + m\angle 4$	(4) $\angle$ Add. Post.
(5) $m\angle PQR = m\angle RSP$	(5) Defn. $\cong$
(6) $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 4$	(6) Substitution
(7) $m\angle 2 + m\angle 3 = m\angle 2 + m\angle 4$	(7) Substitution
(8) $m\angle 3 = m\angle 4$	(8) Subtraction
(9) $\angle 3 \cong \angle 4$	(9) Defn. $\cong$
(10) $\overline{QR} \parallel \overline{PS}$	(10) Conv. alt. int $\angle$ Thm

(11) PQRS is $\parallel$gram (11) Defn. $\parallel$gram

Given : $m\angle 1 = m\angle 4$

14. $\overline{BC} \parallel \overline{ED}$

Prove : $\overline{AB} \parallel \overline{DF}$

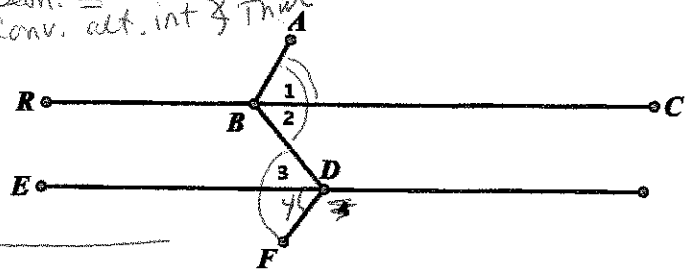


S	R
(1) $m\angle 1 = m\angle 4$, $\overline{BC} \parallel \overline{ED}$	(1) Given
(2) $\angle 2 \cong \angle 3$	(2) alt. int $\angle$ Thm
(3) $m\angle 2 = m\angle 3$	(3) Defn. $\cong$
(4) $m\angle 2 + m\angle 1 = m\angle ABD$ $m\angle 3 + m\angle 4 = m\angle BDF$	(4) $\angle$ add. Post.
(5) $m\angle 2 + m\angle 1 = m\angle BDF$	(5) Substitution
(6) $m\angle BDF = m\angle ABD$	(6) Substitution
(7) $\angle BDF \cong \angle ABD$	(7) Defn. $\cong$
(8) $\overline{AB} \parallel \overline{DF}$	(8) Conv. alt. int $\angle$ Thm

Given : $m\angle ABD = m\angle FDB$

15. $m\angle 1 = m\angle 4$

Prove: $\overline{BC} \parallel \overline{ED}$



S	R
(1) $m\angle ABD = m\angle FDB$, $m\angle 1 = m\angle 4$	(1) Given
(2) $m\angle 1 + m\angle 2 = m\angle ABD$ $m\angle 3 + m\angle 4 = m\angle FDB$	(2) $\angle$ Add. Post.
(3) $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	(3) Substitution
(4) $m\angle 4 + m\angle 2 = m\angle 3 + m\angle 4$	(4) Substitution
(5) $m\angle 2 = m\angle 4$	(5) subtraction
(6) $\angle 2 \cong \angle 4$	(6) Defn. $\cong$
(7) $\overline{BC} \parallel \overline{ED}$	(7) Conv. of alt. int $\angle$ Thm