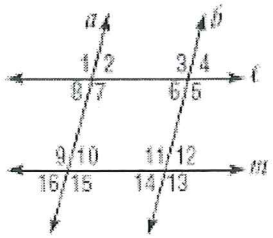
Key

Proving Lines Parallel HW

Given the following information, determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.



1. $\angle 3 \cong \angle 7$

≅ alt int ∠s form // lines

2. $\angle 9 \cong \angle 11$

≅ corr. ∠s form // lines

3. $\angle 2 \cong \angle 16$

≅ alt EXT ∠s form // lines

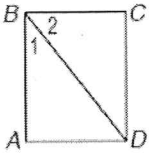
4. $m\angle 5 + m\angle 12 = 180$

Suppl. con. int ∠s form // lines

5. **Given:** $\angle 1$ and $\angle 2$ are complementary.
$\overline{BC} \perp \overline{CD}$

Prove: $\overline{BA} \parallel \overline{CD}$

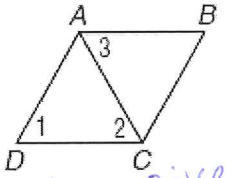
Proof:



Statements	Reasons
1. ∠1 and ∠2 are compl. BC ⊥ CD	1. given
2. ∠1+∠2 = 90	2. def of compl.
3. ∠1+∠2 = ∠ABC	3. angle addition
4. ∠ABC = 90°	4. Substitution
~~5. ∠BCD = 90~~	~~5. def of ⊥~~ not needed
6. AB ⊥ BC	6. def of ⊥
7. BA // CD	7. lines ⊥ to the same line are parallel.

6. **Given:** $\angle 1 \cong \angle 2$, $\angle 1 \cong \angle 3$

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



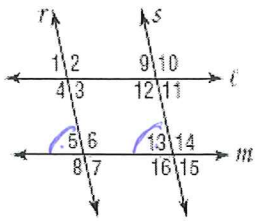
1. ∠1 ≅ ∠2, ∠1 ≅ ∠3	1. given
2. ∠2 ≅ ∠3	2. Substitution
3. AB // DC	3. ≅ alt int ∠s form // lines

Oh look! now we have ≅ alt int ∠s so now we can say // lines.

7. **For Exercises 1–6, complete the proof.**

Given: $\angle 1 \cong \angle 5, \angle 15 \cong \angle 5$

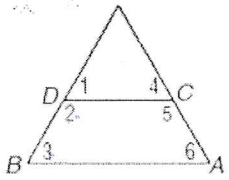
Prove: $\ell \parallel m, r \parallel s$



Statements	Reasons
1. $\angle 15 \cong \angle 5$	1. given
2. $\angle 13 \cong \angle 15$	2. Vertical ∠s are ≅
3. $\angle 5 \cong \angle 13$	3. Substitution
4. $r \parallel s$	4. ≅ Corresponding ∠s form ∥ lines
5. $\angle 1 \cong \angle 5$	5. Given
6. $\ell \parallel m$	6. If corr ∡ are ≅, then lines ∥.

8. **Given:** $\angle 2$ and $\angle 3$ are supplementary.

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



1. ∠2 and ∠3 are suppl. 1. given

2. AB ∥ CD 2. Suppl. Con. int ∠s form ∥ lines

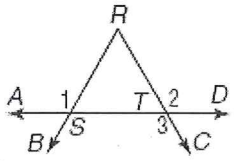
Other Proof Review

9. **Example** **Write a two-column proof.**

Given: $m\angle 1 = m\angle 2, m\angle 2 = m\angle 3$ take off

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

Proof:



1. ∠1 ≅ ∠2, ∠2 ≅ ∠3 1. given

2. ∠2 ≅ ∠3 2. Vertical ∠s are ≅

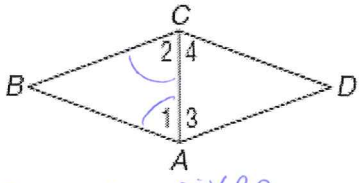
3. ∠1 ≅ ∠3 3. Substitution

10. **Given:** $\overline{AC}$ bisects $\angle BAD$.

$\overline{AC}$ bisects $\angle BCD$.

$\angle 1 \cong \angle 2$

Prove: $\angle 3 \cong \angle 4$



1. AC bisects ∠BAD, AC bisects ∠BCD, ∠1 ≅ ∠2 1. given

2. ∠2 ≅ ∠4, ∠1 ≅ ∠3 2. def of ∠ bisector

3. ∠3 ≅ ∠4 3. Substitution