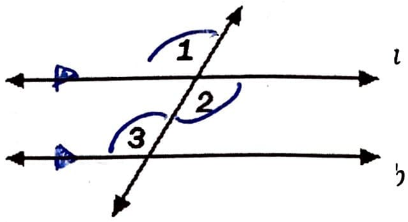
2.7

*skip for 2020

1) Proof of Theorem 2.14 (Alternate Interior Angles Theorem):
If || lines, then alt. int. ∠s ≅.

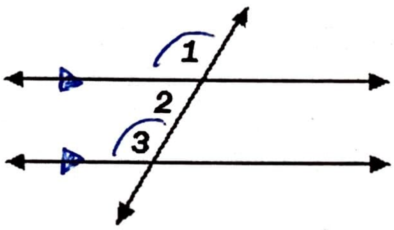


Given: $a \parallel b$

Prove: $\angle 2 \cong \angle 3$

Statements	Reasons
1. a || b	1. Given
2. ∠1 ≅ ∠3	2. || lines → corr ∠s ≅
3. ∠1 and ∠2 are vertical ∠s	3. Diagram
4. ∠1 ≅ ∠2	4. V.A. → ≅
5. ∠2 ≅ ∠3	5. Transitive prop of ≅.

2) Proof of Theorem 2.15 (Consecutive Interior Angles Theorem):
If || lines, then consec. int. ∠s are supplementary.

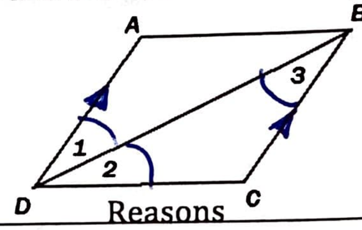


Given: $a \parallel b$
Prove: ∠2 is supplementary to ∠3

Statements	Reasons
1. a || b	1. Given
2. ∠1 ≅ ∠3	2. || lines → corr ∠s ≅
3. ∠1 and ∠2 form a linear pair	3. Diagram
4. ∠2 supp ∠1	4. l.p → supp ∠s
5. ∠2 supp ∠3	5. substitution (2 into 4)

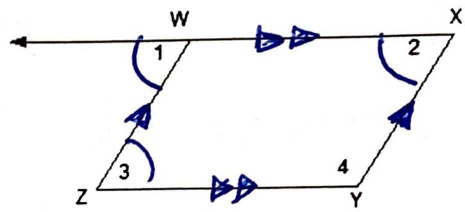
Formal Geometry

Ch 2 Part II Proofs Packet (Notes)



3) Given: $\overline{AD} \parallel \overline{BC}$, $\angle 1 \cong \angle 2$
Prove: $\angle 2 \cong \angle 3$

Statements	Reasons
1. $\overline{AD} \parallel \overline{BC}$, $\angle 1 \cong \angle 2$	1. Given
2. $\angle 1 \cong \angle 3$	2. $\parallel$ lines $\rightarrow$ alt int $\angle$s $\cong$
3. $\angle 2 \cong \angle 3$	3. Transitive

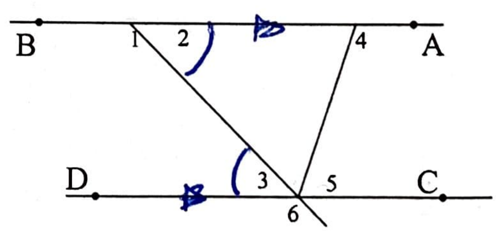


4) Given: $\overline{WZ} \parallel \overline{XY}$

$\overline{WX} \parallel \overline{ZY}$

Prove: $\angle 2 \cong \angle 3$

Statements	Reasons
1. $\overline{WZ} \parallel \overline{XY}$, $\overline{WX} \parallel \overline{ZY}$	1. Given
2. $\angle 1 \cong \angle 2$	2. $\parallel$ lines $\rightarrow$ corr $\angle$s $\cong$
3. $\angle 1 \cong \angle 3$	3. $\parallel$ lines $\rightarrow$ alt int $\angle$s $\cong$
4. $\angle 2 \cong \angle 3$	4. Transitive prop of $\cong$



5) Given: $\overline{AB} \parallel \overline{CD}$

Prove: $\angle 2$ is supp to $\angle 6$

Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$	1. Given
2. $\angle 2 \cong \angle 3$	2. $\parallel$ lines $\rightarrow$ alt int $\angle$s $\cong$
3. $\angle 3$ and $\angle 6$ form a l.p.	3. Diagram
4. $\angle 3$ supp to $\angle 6$	4. l.p $\rightarrow$ supp $\angle$s
5. $\angle 2$ supp to $\angle 6$	5. Substitution (2 into 4)

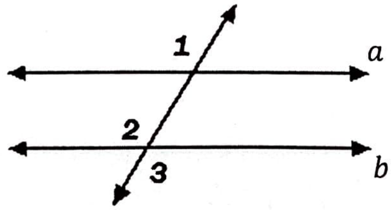
2.9

6) Proof of Theorem 2.20 (Alternate Exterior Angles Converse):

If alt. ext. ∠s ≅ , then ∥ lines.

Given: $\angle 1 \cong \angle 3$

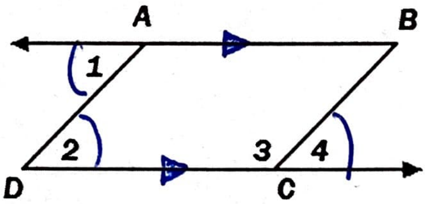
Prove: $a \parallel b$



Statements	Reasons
1. $\angle 1 \cong \angle 3$	1. Given
2. $\angle 2$ and $\angle 3$ are vertical ∠s	2. Diagram
3. $\angle 2 \cong \angle 3$	3. vert ∠s → ≅
4. $\angle 1 \cong \angle 2$	4. Transitive prop of ≅
5. $a \parallel b$	5. corr ∠s ≅ → ∥ lines.

7) *Given:* $\overline{AB} \parallel \overline{CD}$, $\angle 1 \cong \angle 4$

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

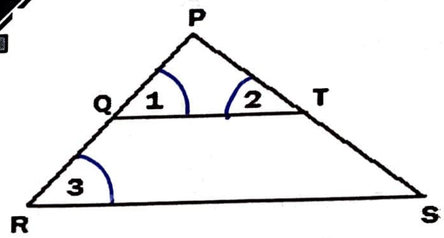


Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$, $\angle 1 \cong \angle 4$	1. Given
2. $\angle 1 \cong \angle 2$	2. ∥ lines → alt int ∠s ≅
3. $\angle 2 \cong \angle 4$	3. Transitive prop of ≅
4. $\overline{AD} \parallel \overline{BC}$	4. corr ∠s ≅ → ∥ lines.

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

$\angle 3 \cong \angle 2$

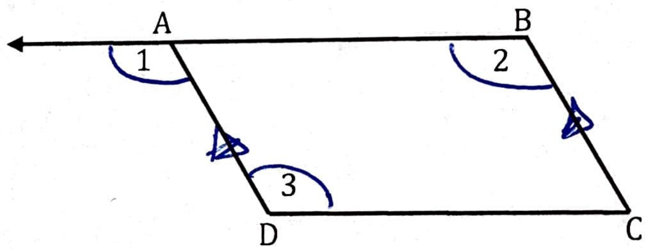
Prove: $\overline{QT} \parallel \overline{RS}$



Statements	Reasons
1. $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 2$	1. Given
2. $\angle 1 \cong \angle 3$	2. Transitive prop of $\cong$.
3. $\overline{QT} \parallel \overline{RS}$	3. corr $\angle$'s $\cong \rightarrow \parallel$ lines

9) Given: $\overline{AD} \parallel \overline{BC}$ and $\angle 2 \cong \angle 3$

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



Statements	Reasons
1. $\overline{AD} \parallel \overline{BC}$, $\angle 2 \cong \angle 3$	1. Given
2. $\angle 1 \cong \angle 2$	2. $\parallel$ lines $\rightarrow$ corr $\angle$'s $\cong$
3. $\angle 1 \cong \angle 3$	3. Transitive prop of $\cong$
4. $\overline{AB} \parallel \overline{DC}$	4. alt int $\angle$'s $\cong \rightarrow \parallel$ lines.