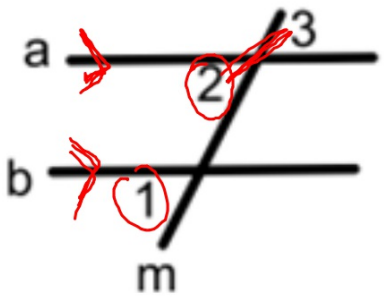
Given: a // b

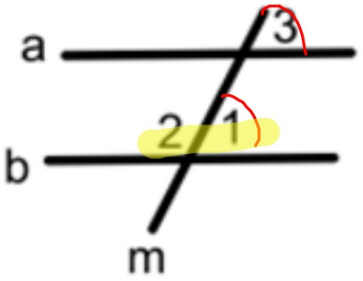
Prove: $m\angle 1 \cong m\angle 3$



Proof #1:

1	a // b	1	Given
2	$m\angle 1 = m\angle 2$	2	corr $\measuredangle \cong$
3	$m\angle 2 = m\angle 3$	3	VA $\cong$ (vertical $\measuredangle \cong$)
4	$m\angle 1 = m\angle 3$	4	transitive

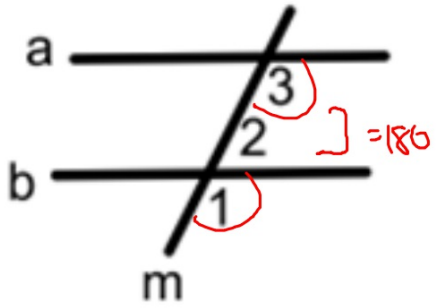
Given: a // b
Prove: $m\angle 2 + m\angle 3 = 180$



Proof #2:

1	a // b	1	Given
2	$m\angle 1 \cong m\angle 3$	2	corr $\cong$
3	$m\angle 1 + m\angle 2 = 180$	3	lin. pair th. or ang add post.
4	$m\angle 2 + m\angle 3 = 180$	4	Substitution

Given: a // b
Prove: $\angle 1 \cong \angle 3$

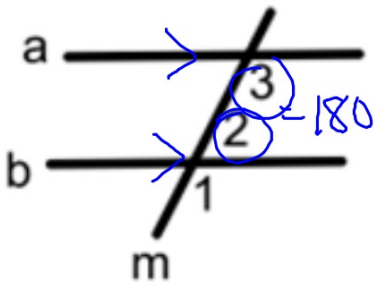


Proof #3:

1	a // b	1	Given
2	$\angle 1 \cong \angle 3$	2	corr $\cong$

Given: $\angle 2$ and $\angle 3$ are supplements

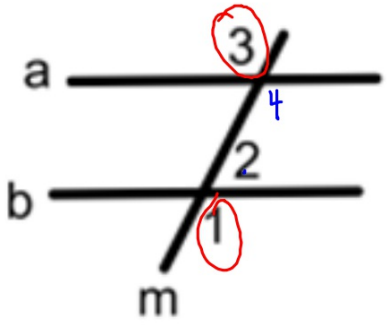
Prove: $\angle 1 \cong \angle 3$



Proof #4:

1	2 & 3 supp.	1	Given
2	a // b	2	If $\angle s 1 = 180$ then // lines
3	$\angle 1 \cong \angle 3$	3	corr $\angle \cong$

Given: $\angle 1 \cong \angle 3$
Prove: a // b



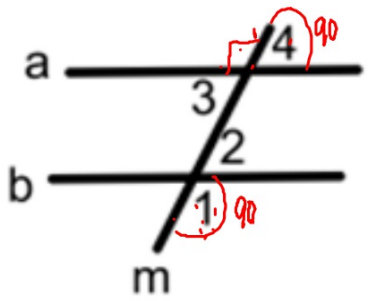
Proof #5:

1	$\angle 1 \cong \angle 3$	1	Given
2	$\angle 1$ and $\angle 3$ are AEA	2	Def AEA
3	a // b	3	If AEA $\cong$ → // lines (converse AEA theor.)

(2) $4 + \angle 2 = 180$ angle add post.
(3) $\angle 3 + \angle 2 = 180$ Substit.
(4) $\angle 3 \cong \angle 4$ vert. $\measuredangle \cong$
(5) $\angle 4 + \angle 2 = 180$ substi.
(6) $\angle 4$ and $\angle 2$ SSI Def SSI
(7) a // b SSI = 180 → // lines

Given: $\angle 1 \cong \angle 4$
$a \perp m$

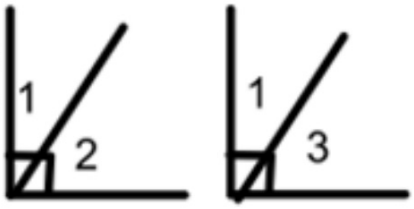
Prove: a // b



Proof #6:

1	$\angle 1 \cong \angle 4$ $a \perp m$	1	Given
2	$\angle 4$ is rt $\angle$ = 90°	2	Def ⊥ lines
3	$\angle 1$ is rt $\angle$ = 90°	3	Substit.
4	$b \perp m$	4	Def ⊥ lines
5	$a \parallel b$	5	If 2 lines ⊥ same transversal then 2 lines are //

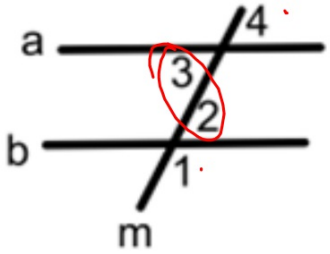
Given: $\angle 2$ & $\angle 1$ form a right angle
$\angle 3$ & $\angle 1$ form a right angle
Prove: $\angle 2 \cong \angle 3$



Proof #7:

1	$\angle 2$ & $\angle 1$ ⊾	1	Given
	$\angle 3$ & $\angle 1$ ⊾		
2	$m\angle 1 + m\angle 2 = 90$	2	Def. compl.
	$m\angle 3 + m\angle 1 = 90$		
3	$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 1$	3	Subst.
4	$m\angle 2 = m\angle 3$	4	Subtraction
5	$\angle 2 \cong \angle 3$	5	Def congruence

Given: $\angle 1 + \angle 4 = 180$
Prove: a // b



1 + 4 = 180
supp 1 + 2 = 180 angle add
3 = 4 VA
supp 1 + 3 = 180 subst.
2 = 3 cong. supplem.

Proof #8:

1 $\angle 1 + \angle 4 = 180$	1
2 $\angle 1 + \angle 2 = 180$	2 $\angle$ add post.
3 $3 = 4$	3 VA $\cong$
4 $\angle 1 + \angle 3 = 180$	4 subst.
5 $\angle 2 = \angle 3$	5 cong. supp th.
6 $\angle 2$ & $\angle 3$ are AIA	6 Def AIA
7 $\checkmark$ a $\parallel$ b	7 if AIA $\cong \rightarrow \parallel$