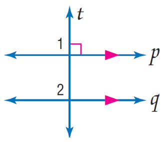
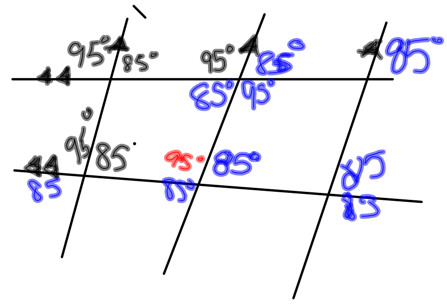
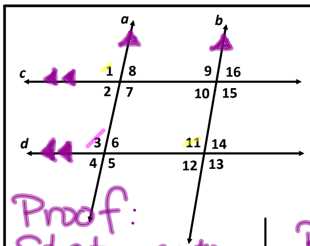
Given: $p \parallel q, t \perp p$
Prove: $t \perp q$
Proof:



Statements	Reasons
1. $p \parallel q, t \perp p$	1. Given
2. $\angle 1$ is a right angle.	2. Definition of $\perp$ lines
3. $m\angle 1 = 90$	3. Definition of right angle
4. $\angle 1 \cong \angle 2$	4. Corresponding Angles Postulate
5. $m\angle 1 = m\angle 2$	5. Definition of congruent angles
6. $m\angle 2 = 90$	6. Substitution Property
7. $\angle 2$ is a right angle.	7. Definition of right angles
8. $t \perp q$	8. Definition of $\perp$ lines



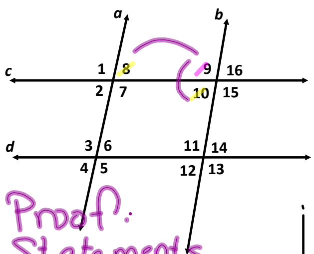


Given: $a \parallel b \quad c \parallel d$

Prove: $\angle 1 \cong \angle 11$

Proof:

Statements	Reasons
$c \parallel d$	Given
~~$\angle 1 \cong \angle 3$~~	Corresponding $\angle$s post.
$a \parallel b$	Given
~~$\angle 3 \cong \angle 11$~~	Corresponding $\angle$s post.
$\angle 1 \cong \angle 11$	Transitive Prop of $\cong$ $\angle$s



Given: $m\angle 8 + m\angle 9 = 180$

Prove: $\angle 8 \cong \angle 10$

Proof:

Statements	Reasons
$m\angle 8 + m\angle 9 = 180$	Given
$\angle 9$ & $\angle 10$ form a linear pair	Def of linear pair
$m\angle 9 + m\angle 10 = 180$	Supplement Theorem
$\angle 8 \cong \angle 10$	$\cong$ supplements theorem.

3-5 Proving Lines Parallel (and Perpendicular)

Addional "Ingredients" for our proofs
- that is, "Reasons"

If corr. $\angle$s are $\cong$, then lines are $\parallel$.

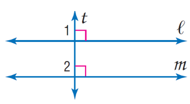
If alt. int. $\angle$s are $\cong$, then lines are $\parallel$.

If cons. int. $\angle$s are suppl., then lines are $\parallel$.

If alt. ext. $\angle$s are $\cong$, then lines are $\parallel$.

If 2 lines are $\perp$ to the same line, then lines are $\parallel$.

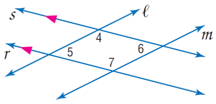
Given: $\ell \perp t$
$m \perp t$
Prove: $\ell \parallel m$



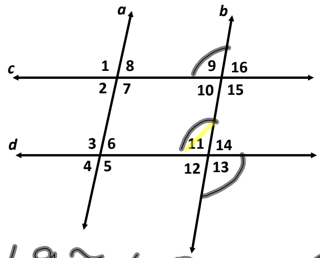
Proof:

Statements	Reasons
1. $\ell \perp t, m \perp t$	1. ?
2. $\angle 1$ and $\angle 2$ are right angles.	2. ?
3. $\angle 1 \cong \angle 2$	3. ?
4. $\ell \parallel m$	4. ?

Given: $r \parallel s$; $\angle 5 \cong \angle 6$
Prove: $\ell \parallel m$
Proof:



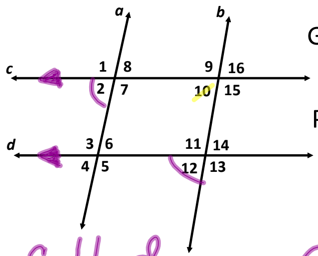
Statements	Reasons
1. $r \parallel s$; $\angle 5 \cong \angle 6$	1. Given
2. $\angle 4$ and $\angle 5$ are supplementary.	2. Consecutive Interior Angle Theorem
3. $m\angle 4 + m\angle 5 = 180$	3. Definition of supplementary angles
4. $m\angle 5 = m\angle 6$	4. Definition of congruent angles
5. $m\angle 4 + m\angle 6 = 180$	5. Substitution
6. $\angle 4$ and $\angle 6$ are supplementary.	6. Definition of supplementary angles
7. $\ell \parallel m$	7. If cons. int. $\measuredangle$ are suppl., then lines are $\parallel$.



Given: $\angle 9 \cong \angle 13$

Prove: $c \parallel d$

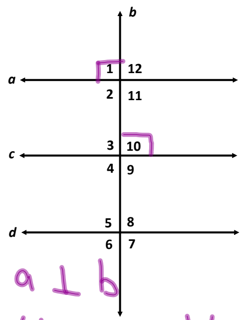
$\angle 9 \cong \angle 13$	Given
$\angle 13 \cong \angle 11$	Vertical $\angle$s $\cong$.
$\angle 9 \cong \angle 11$	Transitive prop
$c \parallel d$	If corr $\angle$s are $\cong$, then lines $\parallel$.



Given: $c \parallel d$ $\angle 2 \cong \angle 12$

Prove: $a \parallel b$

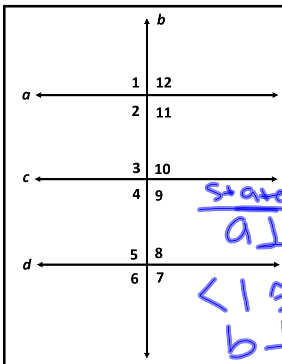
$c \parallel d$	Given
$\angle 10 \cong \angle 12$	Corr. $\angle$s post
$\angle 2 \cong \angle 12$	Given
$\angle 10 \cong \angle 2$	Substitution
$a \parallel b$	If corr. $\angle$s are $\cong$, then lines are $\parallel$.



Given: $a \perp b$ $\angle 1 \cong \cancel{\angle 2}$ $\angle 10$

Prove: $b \perp c$

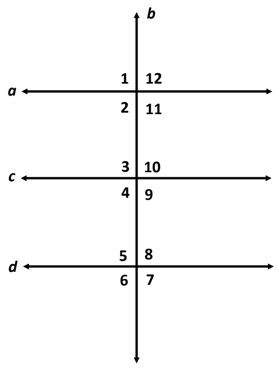
$a \perp b$	Given
$\angle 1$ is a right angle.	Def of $\perp$ lines.
$\angle 1 \cong \angle 10$	Given
$\angle 10$ is a right angle.	All right $\angle$s are $\cong$.
$b \perp c$	Def of $\perp$ lines.



Given: $a \perp b$ $b \perp c$

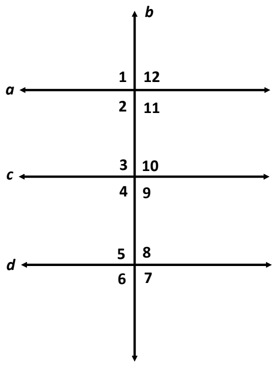
Prove: $a \parallel c$

Statements	Reasons
$a \perp b$	Given
$\angle 1 \cong \angle 3$	Corresponding $\angle$s post.
$b \perp c$	Given
$a \parallel c$	



Given: $a \parallel c$ $c \parallel d$

Prove: $\angle 6 \cong \angle 12$



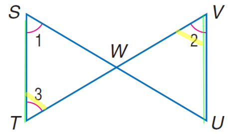
Given: $a \parallel c \parallel d$

Prove:

$\angle 12, \angle 2, \angle 10, \angle 4, \angle 8, \angle 6$ are all congruent.

Given: $\angle 2 \cong \angle 1$, $\angle 1 \cong \angle 3$

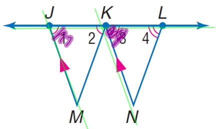
Prove: $\overline{ST} \parallel \overline{UV}$



$\angle 2 \cong \angle 1$ $\angle 1 \cong \angle 3$	Given
$\angle 2 \cong \angle 3$	Transitive Prop. of $\cong \angle$s.
$\overline{ST} \parallel \overline{UV}$	If alt. int. $\angle$s are $\cong$, then lines are $\parallel$.

Given: $\overline{JM} \parallel \overline{KN}$, $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

Prove: $\overline{KM} \parallel \overline{LN}$



$\overline{JM} \parallel \overline{KN}$ $\angle 1 \cong \angle 2$ $\angle 3 \cong \angle 4$	Given
$\angle 1 \cong \angle 3$	Corr. $\angle$s post.
$\angle 2 \cong \angle 4$	Substitution
$\overline{KM} \parallel \overline{LN}$	If corr. $\angle$s are $\cong$, then lines are $\parallel$.