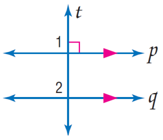
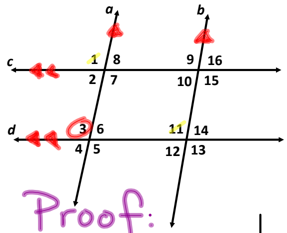
Given: $p \parallel q, t \perp p$
Prove: $t \perp q$
Proof:



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

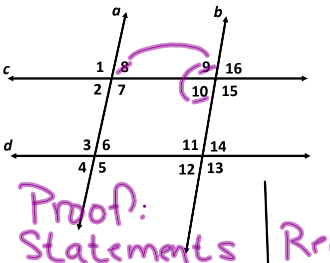


Given: $a \parallel b \quad c \parallel d$

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 $\cong$ $\angle$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. ∠s are ≅, then lines are ∥.

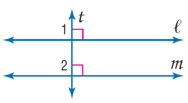
If alt. int. ∠s are ≅, then lines are ∥.

If cons. int. ∠s are suppl., then lines are ∥.

If alt. ext. ∠s are ≅, then lines are ∥.

If 2 lines are ⊥ to the same line, then lines are ∥.

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

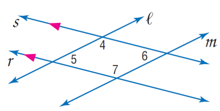


Proof:

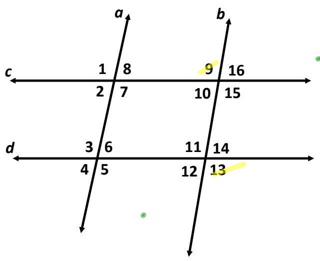
Statements	Reasons
1. $\ell \perp t, m \perp t$	1. ? Given
2. $\angle 1$ and $\angle 2$ are right angles.	2. ? Def $\perp$ lines
3. $\angle 1 \cong \angle 2$	3. ? all right $\angle$s are $\cong$
4. $\ell \parallel m$	4. ?

Postulate: If corresponding $\angle$s are $\cong$, then the lines are $\parallel$.

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. ∠s are suppl., then lines are ∥.



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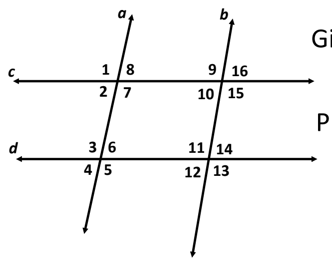
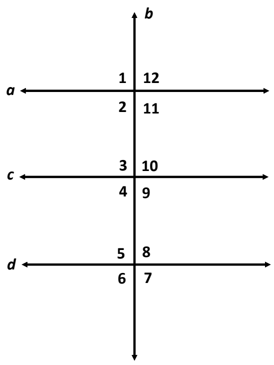
Given: $\angle 9 \cong \angle 13$

Prove: $c \parallel d$



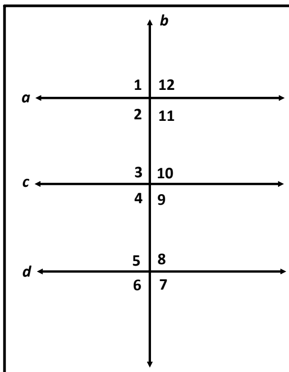
Given: $c \parallel d \quad \angle 2 \cong \angle 12$

Prove: $a \parallel b$



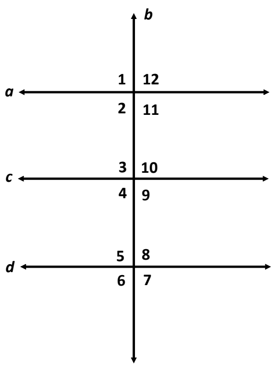
Given: $a \perp b \quad \angle 1 \cong \angle 2$

Prove: $b \perp c$



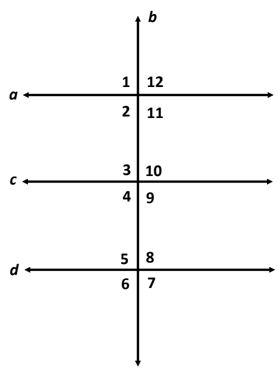
Given: $a \perp b \quad b \perp c$

Prove: $a \parallel c$



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

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

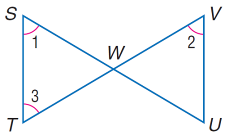


Given: $a \parallel c \parallel d$

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



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