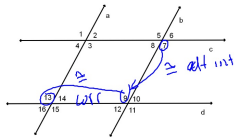
1. Write a proof.

Given: a || b and c || d

Prove: ∠7 ≅ ∠13



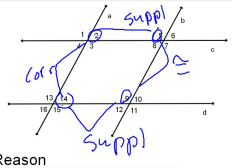

Start by planning it out.

| Statement | Reason |
|---|---|
| a∥b and c∥d | given |
| ∠7 ≅ ∠9 | alt. int. |
| ∠9 ≅ ∠13 | corr. |
| ∠7 ≅ ∠13 | subst. |

2. Write a proof.

Given: a || b and c || d

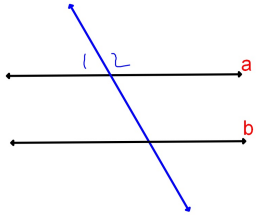
Prove: ∠9 and ∠2 are supplementary.



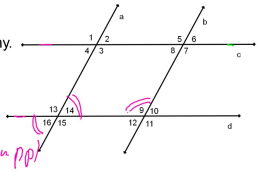

Start by planning it out.

| Statement | Reason |
|---|---|
| a∥b and c∥d | given |
| ∠9 ≅ ∠5 | corre. |
| ∠5 sup. ∠2 | S. SI |
| ∠9 sup ∠2 | subst. |

Give the name for this pair of angles, if there is one, and state their relationship.




Use the given information to determine if there are any parallel lines in the diagram. If there is, state which pair of lines is parallel and give a reason why.




1. ∠4 ≅ ∠6 Yes b/c Alt ext ≅ a∥b

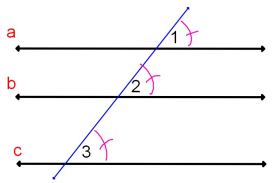
2. ∠16 and ∠1 are supplementary. Y b/c S.S.E. are suppl c∥d

3. ∠12 ≅ ∠8 c∥d Yes b/c corr ∠s ≅

4. ∠16 and ∠9 are supplementary. a∥b Yes b/c SSI are suppl

Given: a || b and a || c

What can you conclude?




∴ b∥c

**Theorem 3-9**

If two lines are parallel to the same line, then they are parallel to each other.

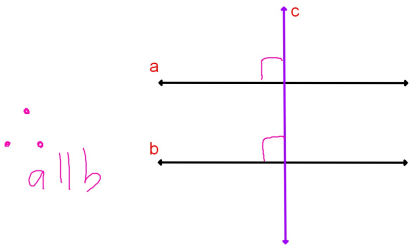
$a \parallel b$


a || c and b || c

∴ a∥b

Given: a ⊥ c and b ⊥ c

What can you conclude?

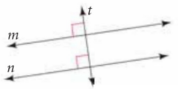



∴ a ∥ b

**Theorem 3-10**

In a plane, if two lines are perpendicular to the same line, then they are parallel to each other.

$m \parallel n$

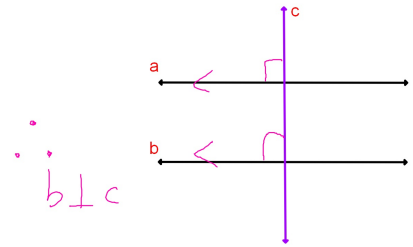



m ⊥ t and n ⊥ t

∴ m ∥ n

Given: a ∥ b and c ⊥ a

What can you conclude?




∴ b ⊥ c

**Theorem 3-11**

In a plane, if a line is perpendicular to one of two parallel lines, then it is also perpendicular to the other.

$n \perp m$

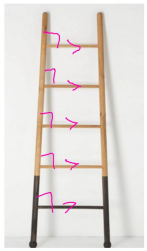

n ⊥ ℓ and n ∥ m

∴ m ⊥ ℓ

**Each of the following statements describes a ladder. What can you conclude about the rungs, one side, or both sides of each ladder? Explain.**

**4.** The rungs are each perpendicular to one side. Rungs are ∥ to each other

**5.** The rungs are parallel and the top rung is perpendicular to one side.

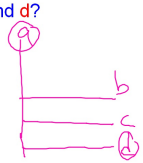


All the other rungs are perpendicular to that side too.

1. What is the relationship between lines a and d?

$a \perp b,\ b \parallel c,\ c \parallel d$

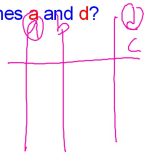
∴ a ⊥ d




2. What is the relationship between lines a and d?

$a \parallel b,\ b \perp c,\ c \perp d$

∴ a ∥ d



3. What is the relationship between lines a and e?

$a \perp b,\ b \parallel c,\ c \parallel d,\ d \perp e$

$\therefore$ a ∥ e


4. What is the relationship between lines a and e?

$a \perp b,\ b \perp c,\ c \parallel d,\ d \perp e$

$\therefore$ a ⊥ e