

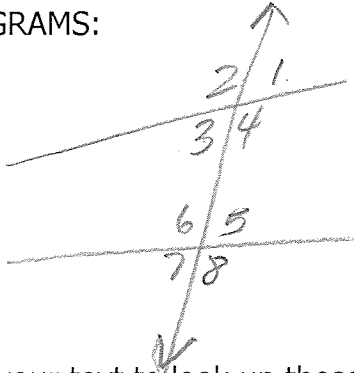
GEOMETRY HONORS
 CHAPTER 3 Lessons 1
 Green text (section 4.2)

date Notes

TOPICS:

Definitions related to parallel lines
 Properties of parallel lines (postulate and theorems)

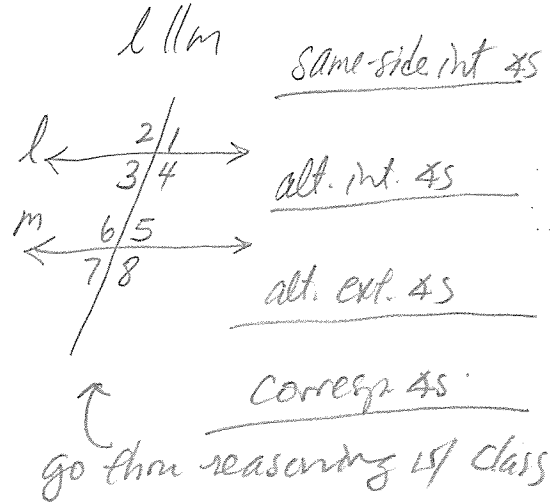
DIAGRAMS:



ext \angle s
 $\angle 1, \angle 2, \angle 7, \angle 8$

inter. \angle s
 $\angle 3, \angle 4, \angle 5, \angle 6$

alternate \angle s
 $\angle 1, 8$



Use your text to look up these definitions:

Parallel lines: - coplanar lines
 - never intersect

Symbol: $l \parallel m$

Skew lines:

Corresponding angles:

Same-side interior angles:

Alternate interior angles:

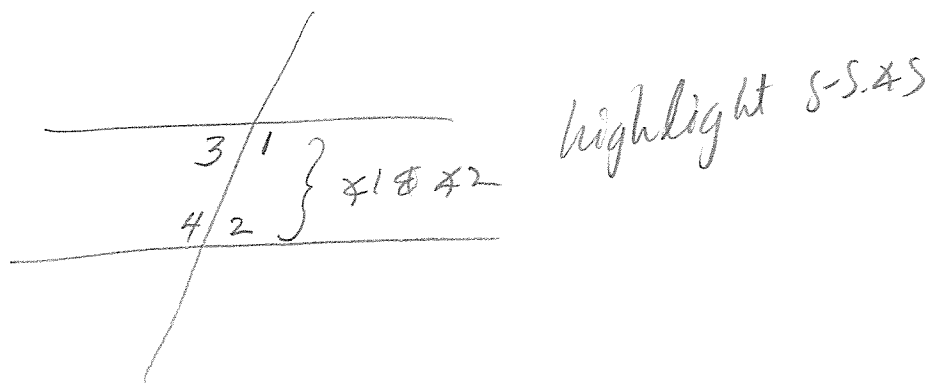
Alternate exterior angles:

Parallel planes: never intersect

A line and a plane are parallel if... they never intersect

The rest of the lesson is based on this postulate:

Postulate: If 2 parallel lines are cut by a transversal,
then the pairs of same-side interior angles are supplementary.

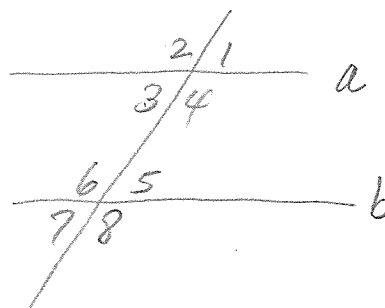


Theorem: If 2 parallel lines are cut by a transversal,
then alternate interior angles are congruent.

Proof:

Given: $a \parallel b$

Prove: $\angle 3 \cong \angle 5$



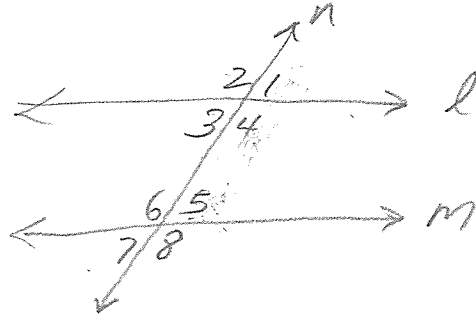
① $a \parallel b \rightarrow$ ② $\angle 4$ supp $\angle 5 \rightarrow$ ⑤ $\angle 3 \cong \angle 5$
 ③ $\angle 3$ & $\angle 4$ linear pair. \rightarrow ④ $\angle 3$ supp $\angle 4$

- ① Given
- ② 2 ll lines cut by trans. \rightarrow same side int. \angle s suppl.
- ③ linear pair are 2 \angle s that form straight line.
- ④ linear pair are 2 \angle s system.
- ⑤ System. of same \angle are \cong .

Theorem: If 2 parallel lines are cut by a transversal, then corresponding angles are congruent.

Proof:

Given: $l \parallel m$
transversal n



Prove: $\angle 1 \cong \angle 5$
 $\angle 3 \cong \angle 7$

- ① $l \parallel m \rightarrow$ ② $\angle 4$ suppl. $\angle 5 \rightarrow$ ⑤ $\angle 1 \cong \angle 5$
 ③ $\angle 1$ & $\angle 4$ linear pair \rightarrow ④ $\angle 1$ & $\angle 4$ suppl. ⑥ $\angle 1 \cong \angle 3$ \rightarrow ⑦ $\angle 3 \cong \angle 5$
 ⑧ $\angle 5 \cong \angle 7$

① Given

② 2 \parallel lines cut by trans.
 \rightarrow same side int. $\angle 5$ suppl.

③ linear pair are 2 \angle s that form a straight line

④ linear pair are 2 \angle s suppl.

⑤ Supplements of same \angle are \cong .

⑥ Vertical \angle s \cong .

⑦ Transitive Prop.

⑧ Vertical \angle s \cong .

⑨ Transitive Prop.

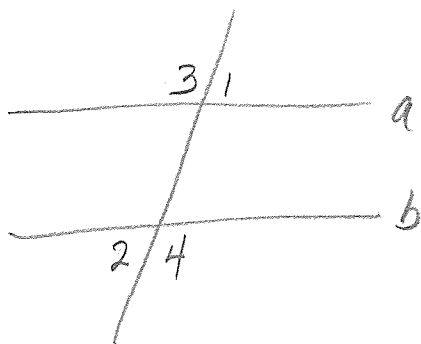
⑨ $\angle 3 \cong \angle 7$

Theorem: : If 2 parallel lines are cut by a transversal, then alternate exterior angles are congruent.

If you know:
 $a \parallel b$

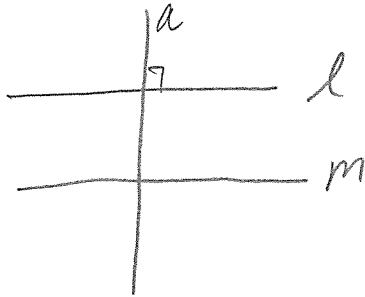
then you can conclude:

$\angle 1 \cong \angle 2$
 $\angle 3 \cong \angle 4$



Theorem: : If a transversal is perpendicular to one of two parallel lines, then it is perpendicular to the other one also.

If you know : $l \parallel m$, $a \perp l$, then conclude:
 $a \perp m$.



Theorem: If two parallel planes are cut by a third plane, then the lines of intersection are parallel.

[Faint handwritten notes, possibly related to the theorem above]