Class: Honors Geometry
Date: 9/14/06
Topic: Lesson 3-2 (Proving Lines Parallel)

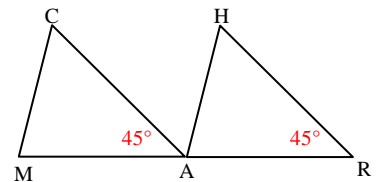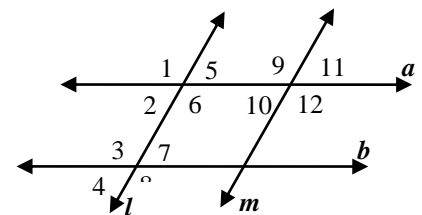|	
Postulate 3-2	<u>Converse of Corr. $\angle's$ Post. (Converse of Post 3-1)</u> If 2 lines & transv. form $\cong$ corr. $\angle's$, the 2 lines are parallel.

Theorem 3-3	<u>Converse of Alt Int $\angle's$ Thm (Converse of Thm 3-1)</u>
	If 2 lines & transv. form $\cong$ alt int $\angle's$ the 2 lines are parallel.
	
	Proof: $\angle 1 \cong \angle 2$ Given
	       $\angle 1 \cong \angle 5$ Vertical $\angle's$ are $\cong$ (Theorem 2-1)
	       $\angle 2 \cong \angle 5$ Substitution POC
	       $l \parallel m$ Corresponding $\angle's$ are $\cong$ (Postulate 3-2)
	       Q.E.D.

Theorem 3-4	<u>Converse of Same-Side Int $\angle's$ Thm (Converse of Thm 3-2)</u> If 2 lines & transv. form suppl same-side int $\angle's$ the 2 lines are parallel.
Example	Pg 125, #2 – Which lines/segs are parallel & justify: $\overline{MR}$ is transversal. $m\angle CAM = m\angle HRA = 45$; $\angle CAM \cong \angle HRA$ & are corr $\angle's$. $\overline{CA} \parallel \overline{HR}$ (Post 3-2)
Example	Pg. 125, #4-14 even 4. $\angle 2$, $\angle 3$ suppl - $a \parallel b$; conv same-side int $\angle's$ thm 6. $\angle 4$, $\angle 8$ suppl - none; adj suppl angles not sufficient 8. $\angle 1 \cong \angle 3$ - $a \parallel b$; conv of corr $\angle's$ post. 10. $\angle 3 \cong \angle 6$ - $a \parallel b$; conv of alt int $\angle's$ theorem 12. $\angle 1 \cong \angle 6$ - none; vert $\angle's$ not sufficient 14. $\angle 11 \cong \angle 7$ - none; would have to assume lines are parallel

Theorem 3-5	If 2 lines parallel to same line, they're parallel to each other.
Theorem 3-6	**In a plane**, if 2 lines $\perp$ to same line, they parallel to ea other.

Theorem 3-6

<u>Proof</u>: $m \perp l$, $n \perp l$ Given

Corr $\angle's$ both rt $\angle's$ Defn perpendicular

Corr $\angle's$ are $\cong$ Thm 2-4 (all rt $\angle's$ $\cong$)
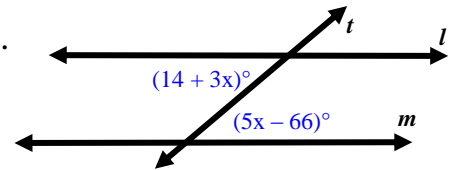
$m \parallel l$ Conv Corr $\angle's$ Post (3-2)

Q.E.D.

Example

Not in book – Find x so $l \parallel m$.

$(14 + 3x)°$

$(5x - 66)°$ m

t l

$\angle's$ are alt int $\angle's$.
Use Thm 3-1…

$14 + 3x = 5x - 66$ Alt int $\angle's \cong$

$\quad\quad 80 = 2x$ Subtr & Add POE (+66, -3x both sides)

$\quad\quad 40 = x$ Div POE ($\div 2$ both sides)