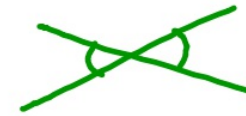


Good afternoon: Warm up in notebook

Rewrite the following theorem into its converse, inverse, and contrapositive.
Then, evaluate each as true or false. If false, give a "counterexample"

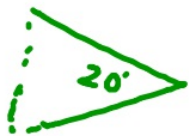
$$Q \rightarrow P \quad \sim P \rightarrow \sim Q \quad \sim Q \rightarrow \sim P$$

$$P \rightarrow Q$$



If two angles are vertical angles, then they are congruent.

Converse: If two angles are congruent, they are vertical. F



Inverse: If two angles are not vertical, then they are not congruent. F

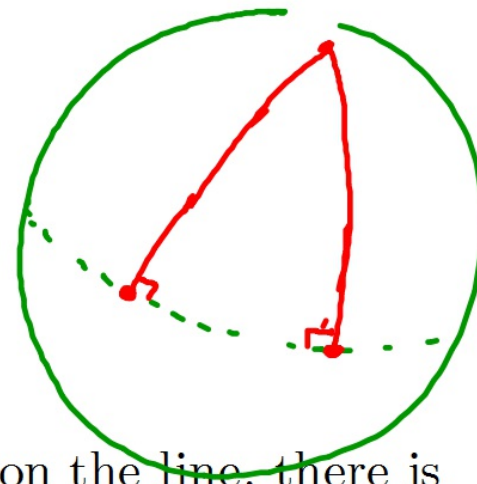
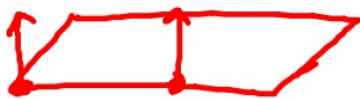
Contrapositive: If two angles are not congruent, then they are not vertical. T

Reminders:

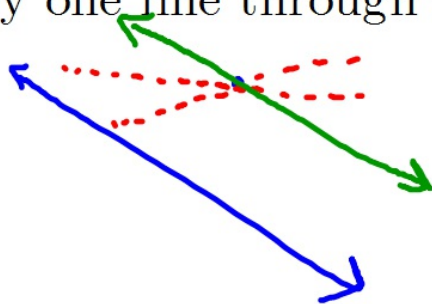
- tutoring today 4-5p
- DS reassessments
- Thursday, Fri
- Assess. on proof and lines/angles Monday

Constructing Parallel Lines

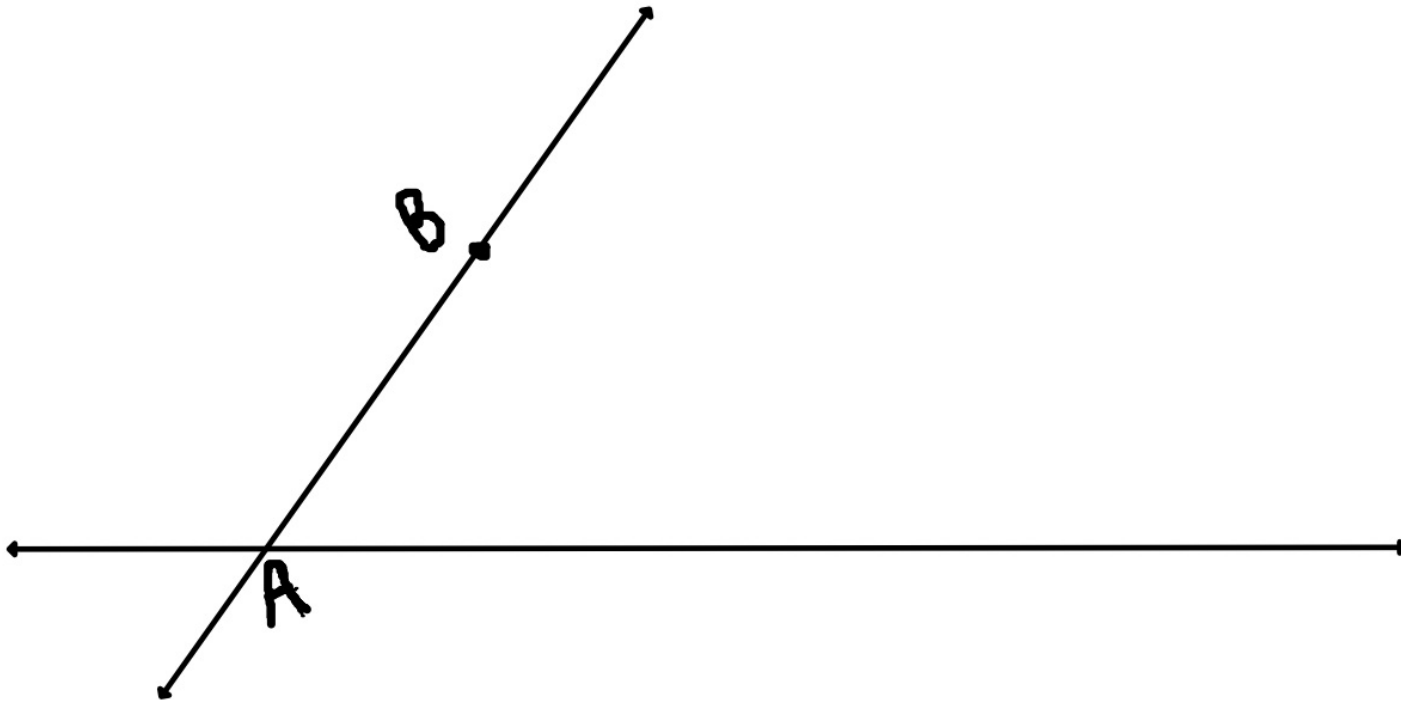
(notes)



Euclid's 5th postulate: Given a line and a point not on the line, there is only one line through the given point that is parallel to the given line.

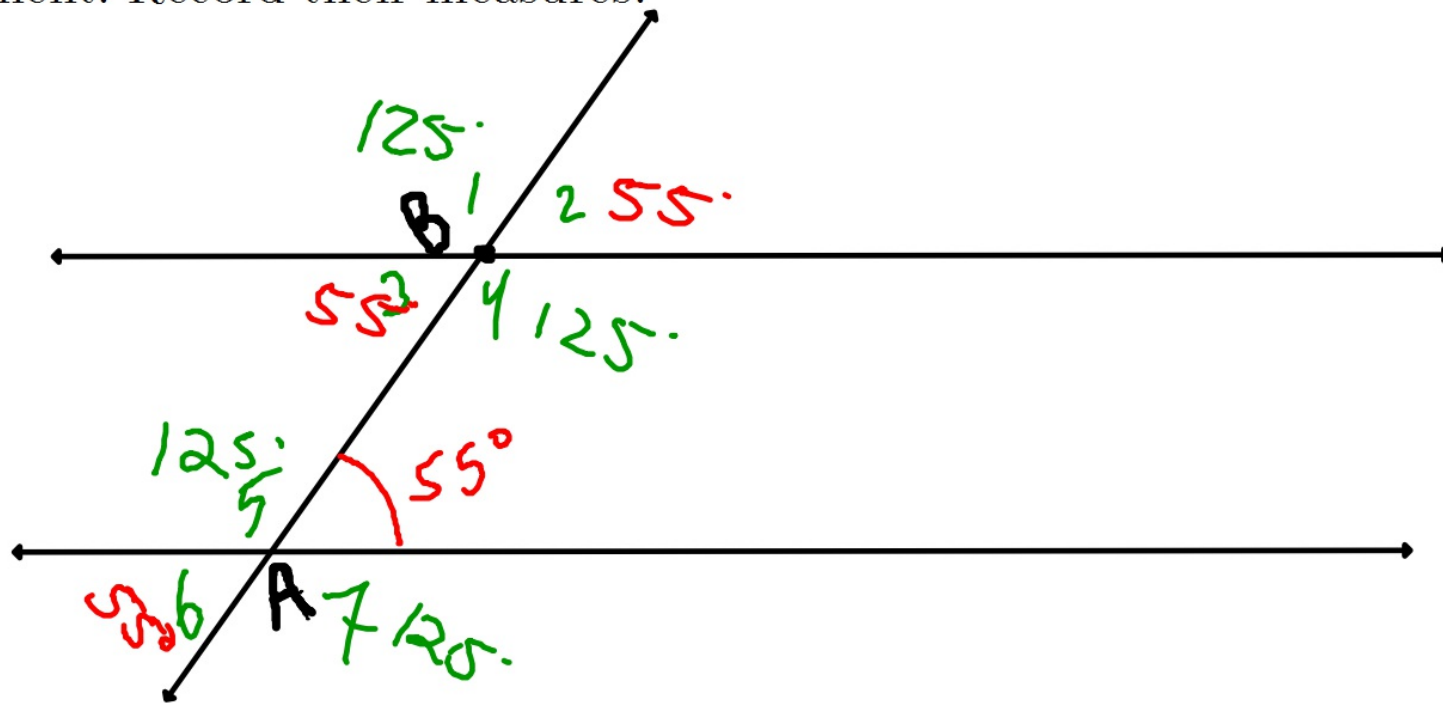


Use your straightedge and create angle A. Mark a point on one of the rays of the angle and call it B.



Using a protractor

Measure the original angle you made. Then calculate the 7 other angles without measurement. Record their measures.



Postulate from yesterday:

If the lines are parallel, then corresponding angles are congruent.

Is the converse true?

If corresp. angles are \cong , then the lines are \parallel .

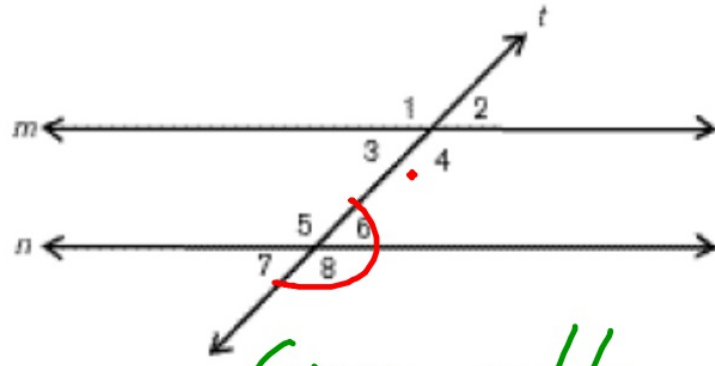
Biconditional Statement

*Lines are parallel
if and only if
their corresp angles are \cong .*

"parallel"

<http://www.mathopenref.c>

How do you prove relationships?



Given: $m \parallel n$

Prove: $\angle 2 + \angle 8 = 180^\circ$

Given $m \parallel n$, $\angle 2 \cong \angle 6$ because they're corresponding.

~~$\angle 6 + \angle 8 = 180^\circ$~~ , b/c they make a line.

By substitution

$\angle 2 + \angle 8 = 180^\circ$. Q.E.D.

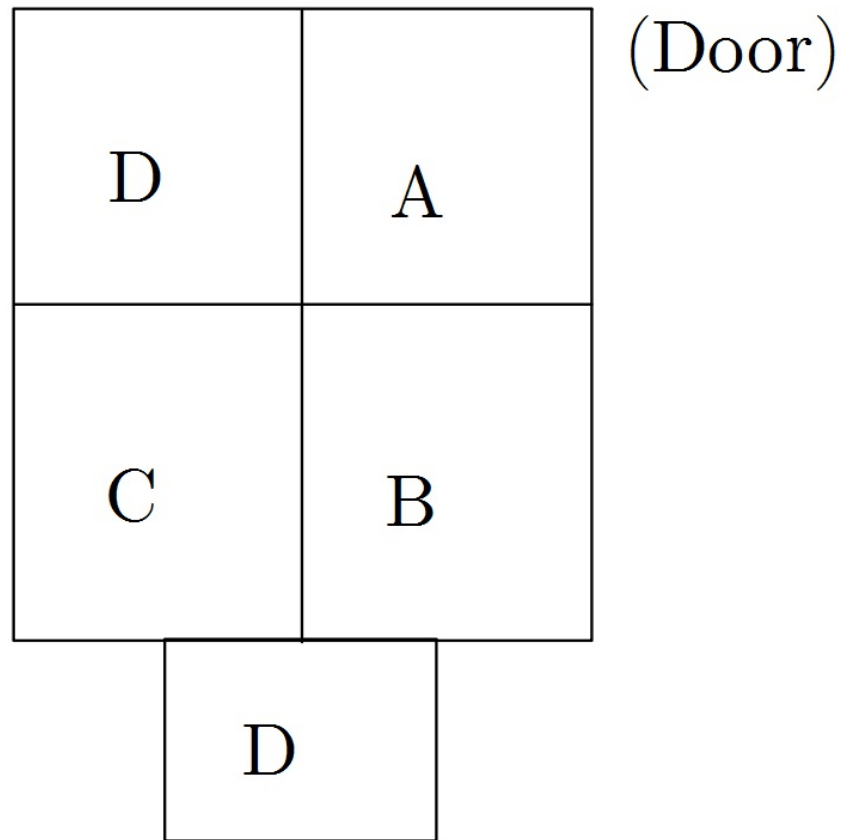
Jigsaw

Each of your table mates is going to work on a different problem (A,B,C,D)

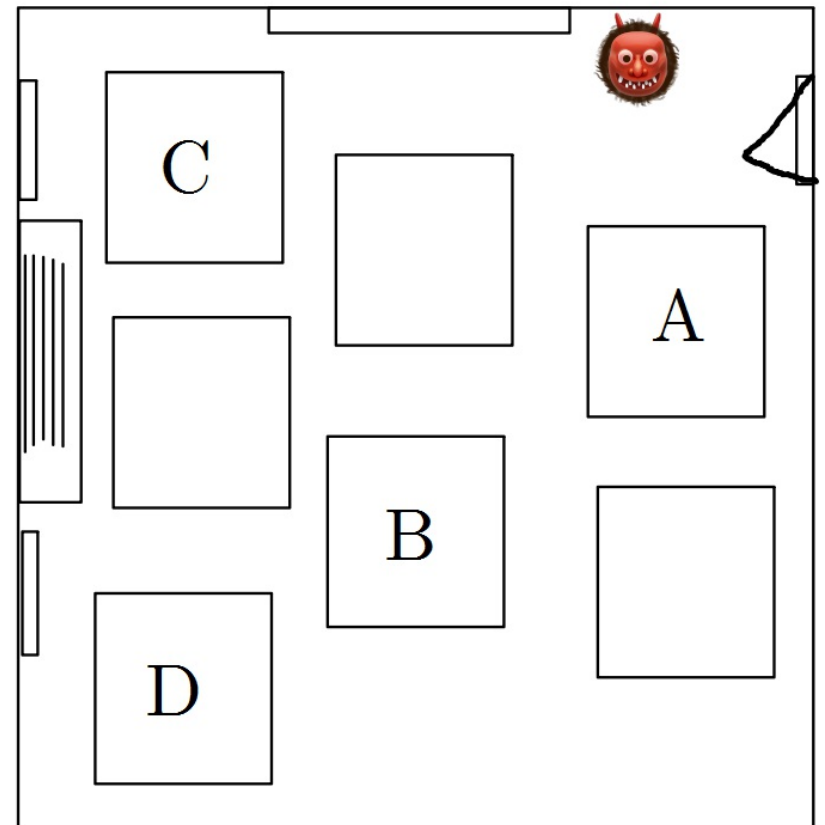
We will spend 7 minutes in re-arranged expert groups where everyone works on the same problem.

Then we return to our original tables and person A presents their problem while the rest listens, writes down information, and asks questions. Then B, C, and D present, etc.

(Promethean board)



Expert Group Locations



Expert Groups

Work on your proof together. Start with the given info and any postulates you know, then logically arrive at your "Prove" conclusion.

Home Groups

Person A explains their problem, others listen, write, ask questions.

Then Person B explains their problem....etc.

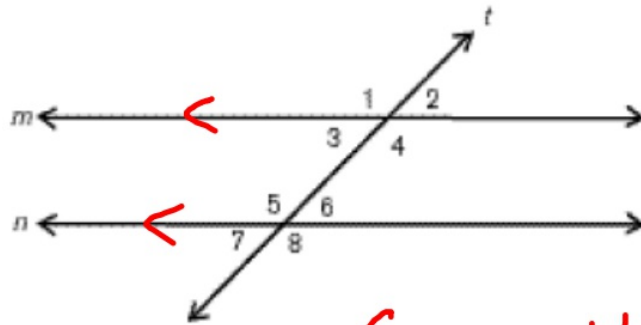
Homework

p. 35 #28-32 [CO-C9a]

p. 87 #12-16 [CO-C9b]

Completed Proofs

Task A



Given: $m \parallel n$

Prove: $\angle 2 \cong \angle 7$

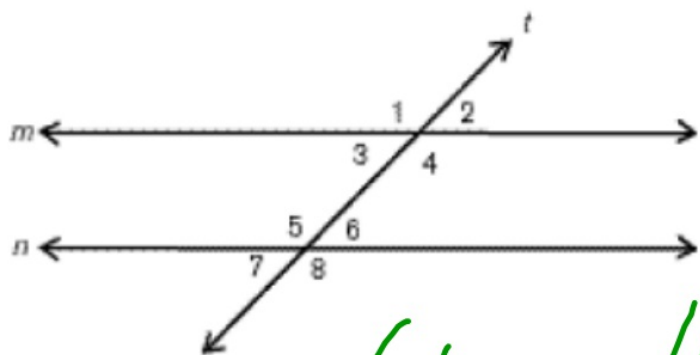
(Hint: remember that corresponding angles are congruent as an assumption, and that we have proven vertical angles are always congruent)

Given that $m \parallel n$, so corresponding angles $\angle 2 \cong \angle 6$.

By vertical angles, $\angle 6 \cong \angle 7$.

So $\angle 2 \cong \angle 6 \cong \angle 7 \Rightarrow \angle 2 \cong \angle 7$.
QED.

Task B



Given: $m \parallel n$

Prove: $\angle 3 + \angle 5 = 180^\circ$

(Hint: Corresponding angles of parallel lines are congruent as an assumption, and note that $\angle 1 + \angle 3 = 180^\circ$)

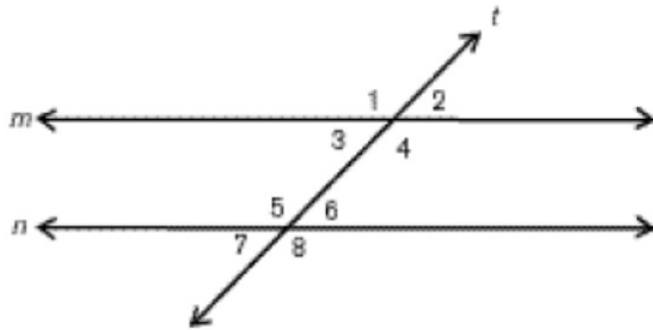
Given $m \parallel n$, so $\angle 1 \cong \angle 5$ by corresponding angles.

$\angle 1 + \angle 3 = 180^\circ$ b/c they form a line.

By substitution,

$$\angle 5 + \angle 3 = 180^\circ \text{ Q.E.D.}$$

Task C



Given: $\angle 5 \cong \angle 4$

Prove: $m \parallel n$

(Hint: We have proven that vertical angles are congruent, and have postulated that lines are parallel if and only if their corresponding angles are congruent.)

Note! can't use corresp. angles here b/c lines aren't known to be parallel!

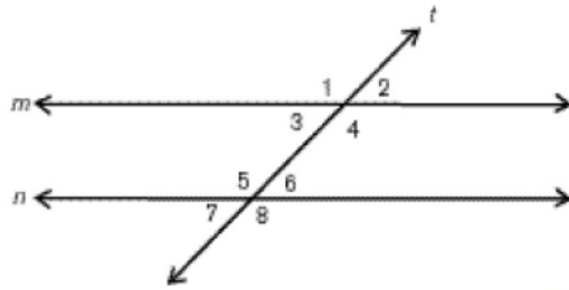
Given $\angle 5 \cong \angle 4$.

By vertical angles,
 $\angle 1 \cong \angle 4$.

So, $\angle 5 \cong \angle 4 \cong \angle 1$,

or $\angle 5 \cong \angle 1$. Since they're corresponding, the lines are parallel. Q.E.D.

Task D



Given: $\angle 4 + \angle 6 = 180^\circ$

Prove: $m \parallel n$

(Hint: Note that $\angle 2 + \angle 4 = 180^\circ$, and have postulated that lines are parallel if and only if their corresponding angles are congruent.)

We are given that $\angle 4 + \angle 6 = 180^\circ$
Since they make a line, $\angle 2 + \angle 4 = 180^\circ$

By substitution,

$$\begin{array}{r} \angle 2 + \angle 4 = \angle 4 + \angle 6 \\ - \angle 4 \quad - \angle 4 \\ \hline \end{array}$$

$$\angle 2 = \angle 6 \text{ (corresponding angles)}$$

Since corresponding angles are \cong , the lines are parallel. Q.E.D.