Good afternoon: warm up in notebooks

If a polygon has exactly three edges and vertices,
then the polygon is a triangle.

Write the converse of the statement above. Is it true?

If so, combine them into a biconditional.
If not, give a counterexample.

Reminders:
retakes available in DS   Q1 ends 2 weeks from today
next assessment: Tuesday

If a polygon has exactly three edges and vertices, then the polygon is a triangle. $P \to Q$

Converse:

If a polygon is a triangle, then the polygon has exactly three edges and vertices. $Q \to P$

T

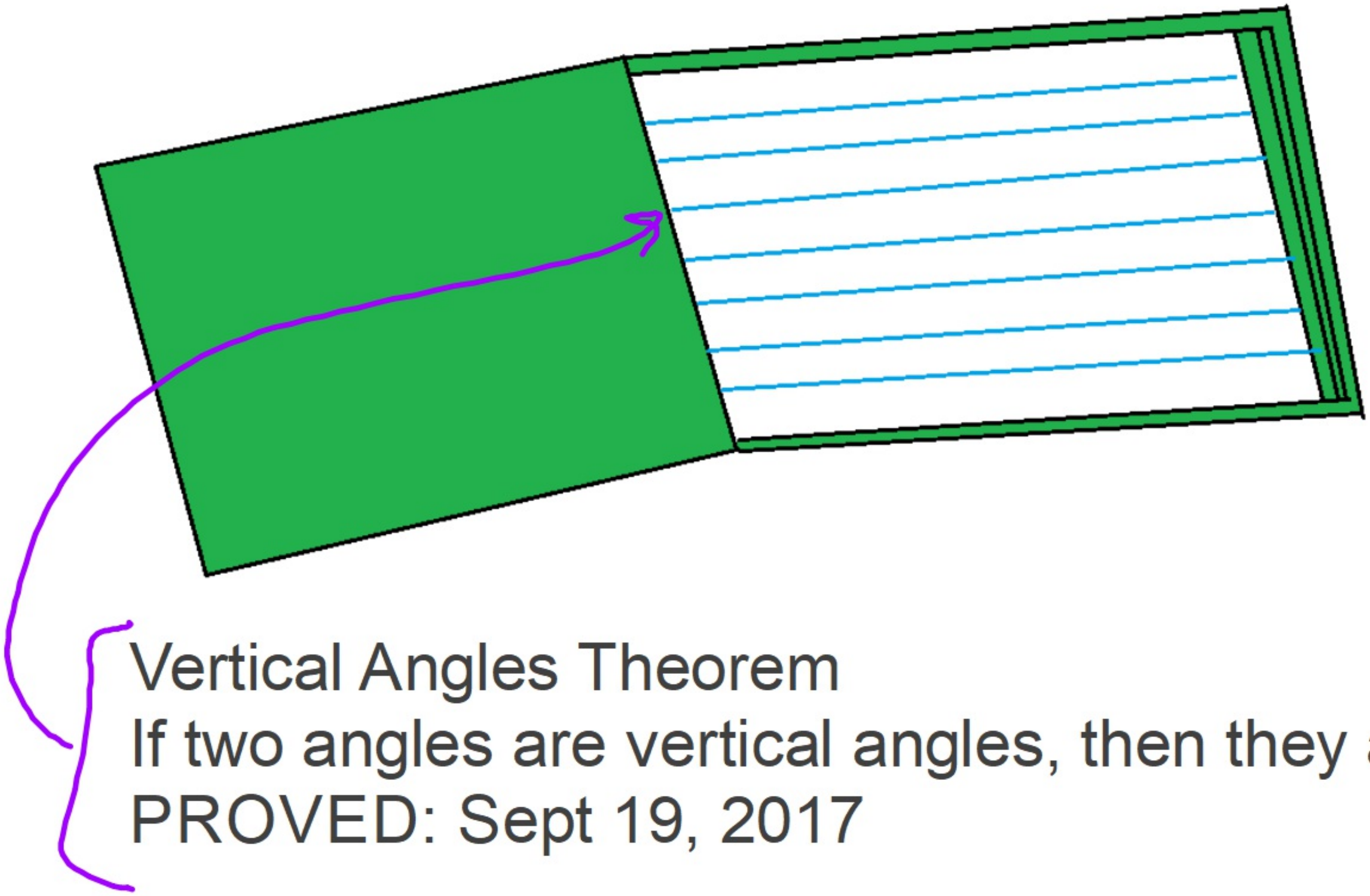
Biconditional

$P \rightleftarrows Q$

A polygon has exactly 3 edges and vertices if and only if the polygon is a $\triangle$.

iff

Visually Random Grouping



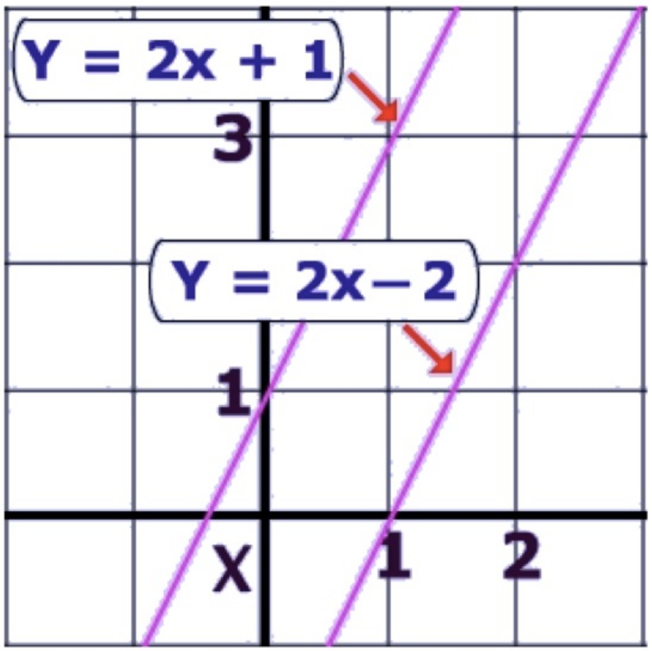
Vertical Angles Theorem

If two angles are vertical angles, then they are congruent

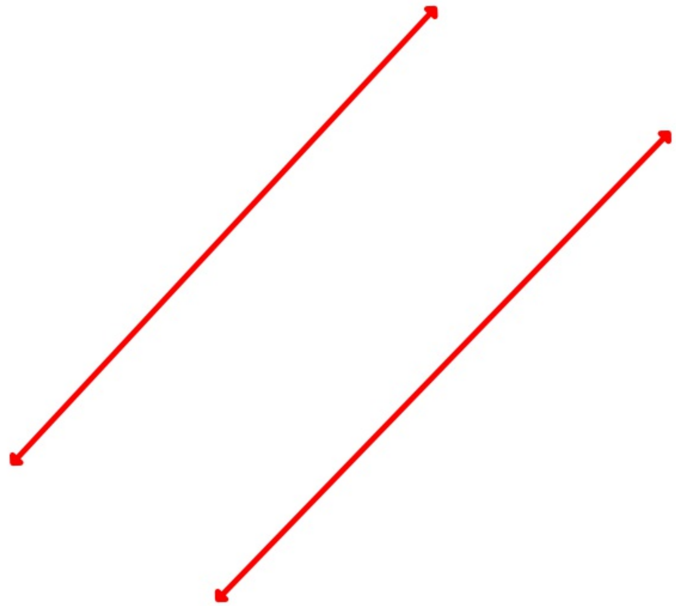
PROVED: Sept 19, 2017

What kinds of things will we prove?

Will these lines ever cross?

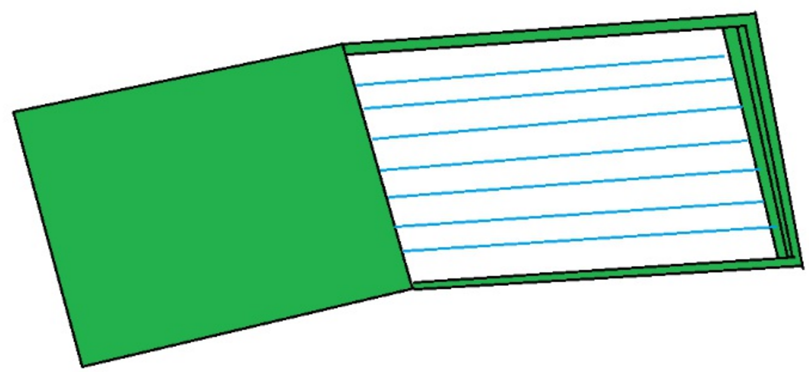


Will these??



Corresponding Angles Postulate (Assumption)

Lines are parallel if and only if the corresponding angles are ≅

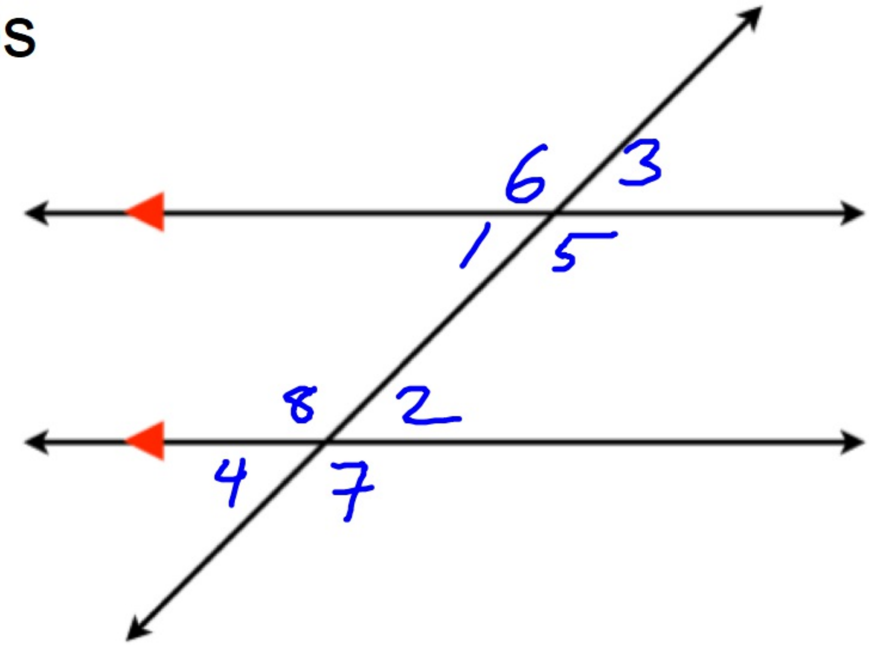


http://www.mathopenref.com/anglescorresponding.html

https://www.youtube.com/watch?v=b49JnSpiogE

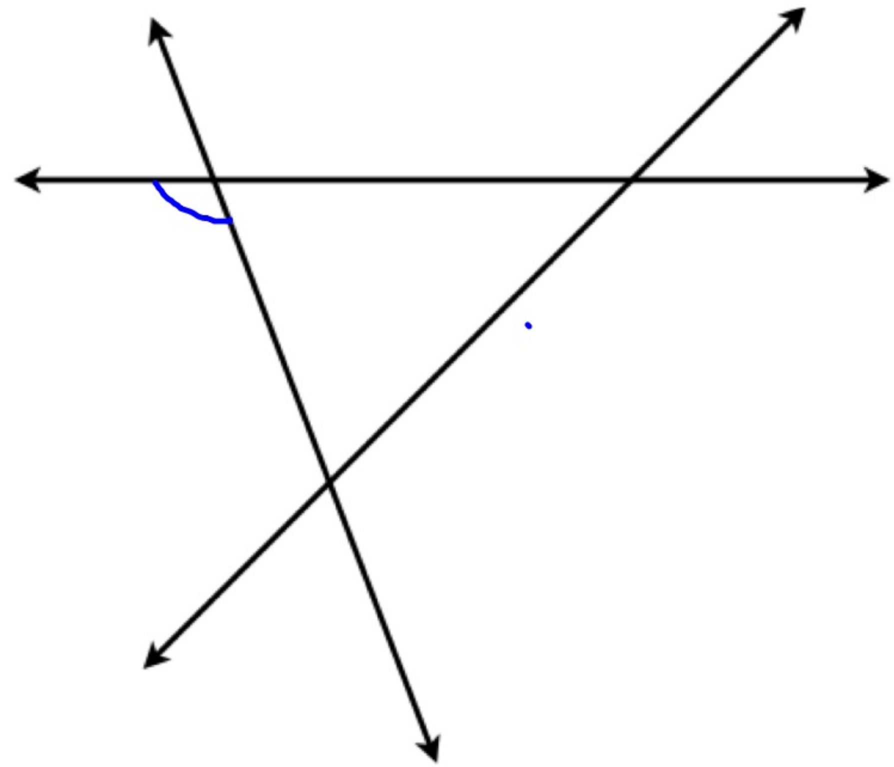
Reviewing Angle Relationships

Angles	Relationship
1, 2	Alternate Interior angles
3, 4	Alternate Exterior angles
6, 7	Alternate Exterior angles
6, 8	Corresponding angles
1, 3	Vertical angles
2, 5	Same-side Interior angles
2, 8	Linear Pair

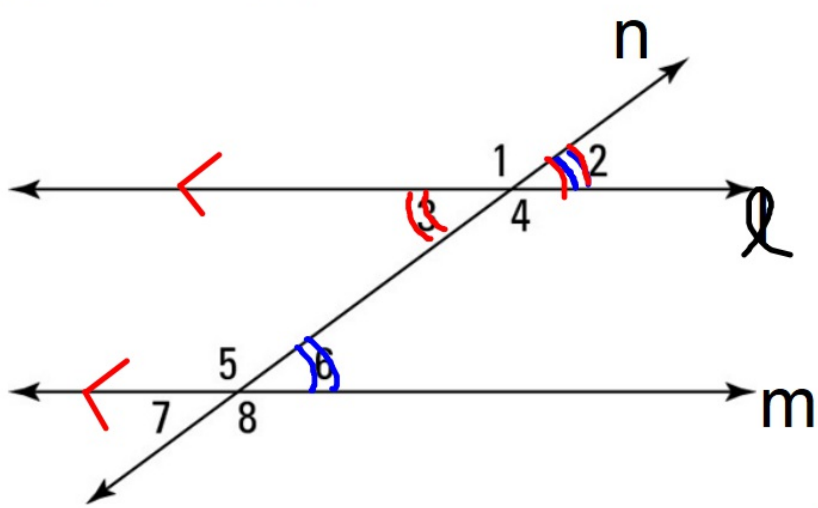


*__Given__: Angles 1 and 4 are interior angles of the triangle.

Angles	Relationship
3, 1	Alternate Interior angles
1, 10	Same-side interior
5, 1	Vertical angles
2, 10	Linear Pair
5, 2	Alternate exterior angles
10, 11	Corresponding angles
11, 1	Alternate interior angles
10, 12	Corresponding angles
9, 6	Corresponding angles
9, 11	Vertical angles
7, 3	Alternate exterior angles
2, 3	Vertical angles
8, 3	Same-side interior



Another Proof



Given: l // m

Prove: $\angle 3 \cong \angle 6$

$\angle 2 \cong \angle 6$ (parallel & corresponding)

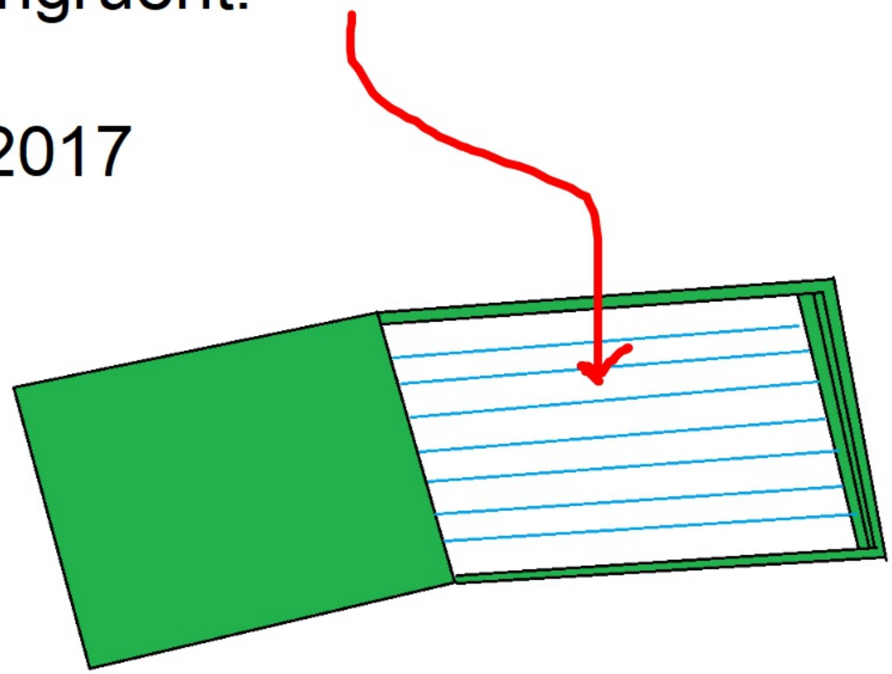
$\angle 2 \cong \angle 3$ (vertical angles)

$\angle 3 \cong \angle 6$ (transitive property.)

Alternate Interior Angles Theorem

If parallel lines are cut by a transversal, then the alt. interior angles are congruent.

PROVED: Sept 21, 2017

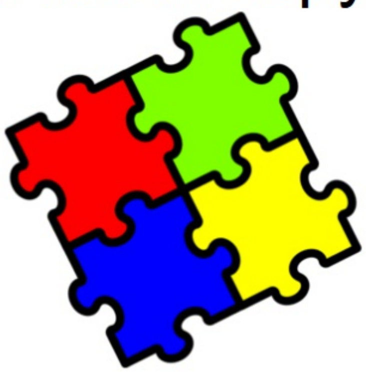


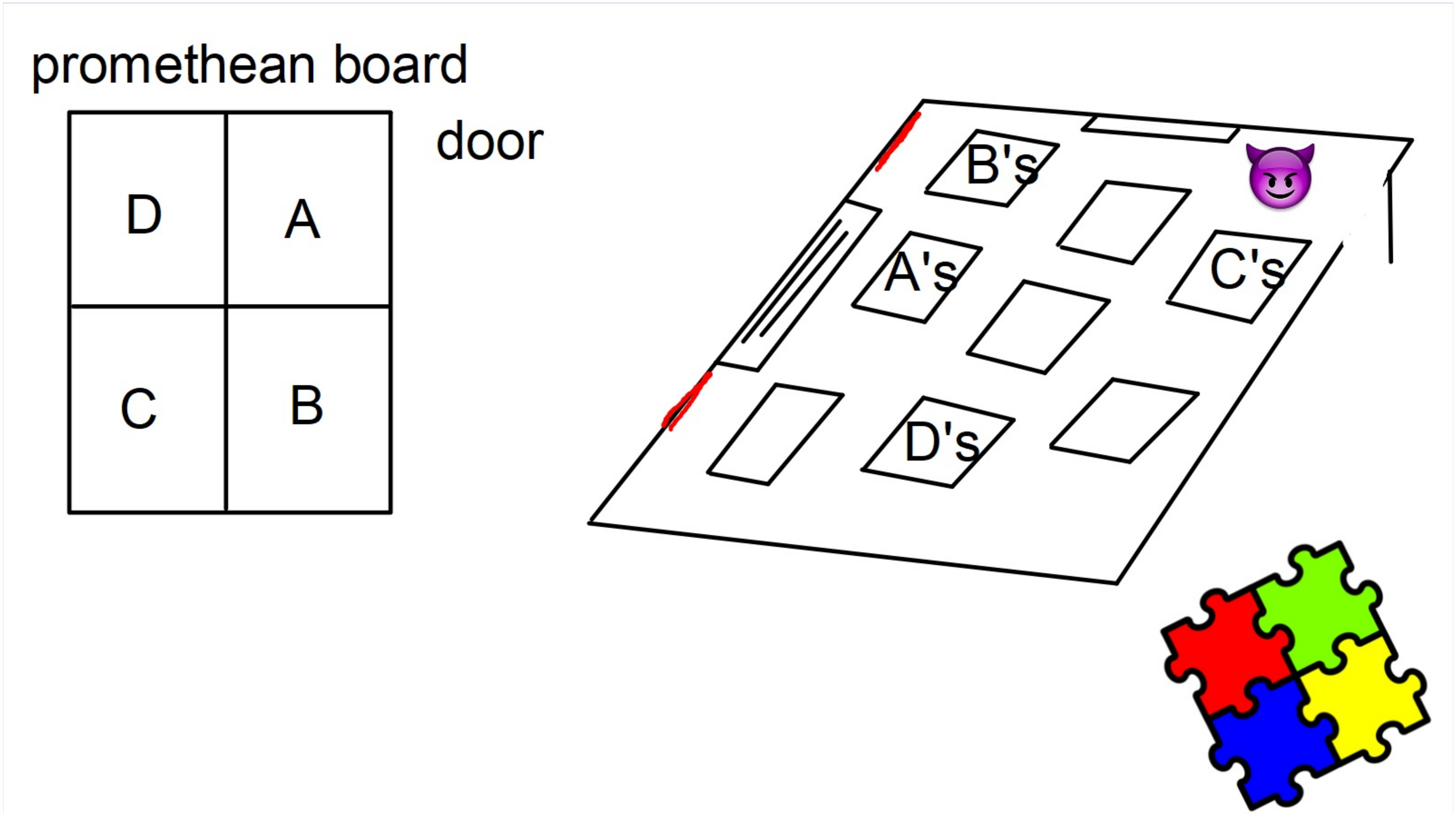
Your turn to write proofs!

Jigsaw groups:
Each tablemate works on a different problem (A,B,C,D)

People doing A meet up together, B's meet up, etc.
Work for about 8 minutes in these expert groups

Return home, person A explains proof, others listen/copy
Then B shares, and so on.




promethean board
D
A
C
B
door
B's
A's
C's
D's

Expert Groups

Start with the given, and use deductions to logically arrive at the "Prove" statement as your conclusion.

Home Groups

Person A describes their proof, others listen, take notes, ask questions.

Then B describes their proof, and so on.

Alternate Exterior Angle Theorem

BOOKLET

If parallel lines are cut by a transversal, then alt. exterior angles are congruent.

Same Side Interior Angle Theorem

If parallel lines are cut by a transversal, then same side interior angles are supplementary.

Converse of Alternate Interior Angle Theorem

If lines cut by a transversal form congruent alternate interior angles, then the lines are parallel.

Converse of Same Side Interior Angle Theorem

If lines cut by a transversal form supplementary same side interior angles, then the lines are parallel.

HW
p. 87 #1-15 (odds only)
Next assessment: Tuesday

You'll see notations like $m\angle 6=120^\circ$...the m stands for measure. You can safely ignore the "m"

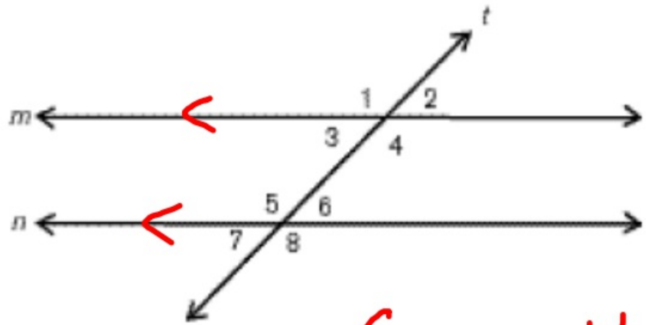
Here for a retake?

Please know which skill(s) you need to retake AND have the aligned hw that goes with them ready to show me before requesting the new version thanks :)

People are testing in here so please be respectful/quiet

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)

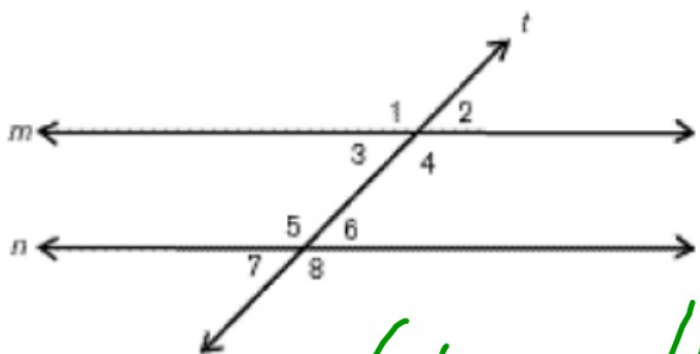
Given that $m // n$, so corresponding angles $\angle 2 \cong \angle 6$.

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

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

QED.

Task B



Given: $m \parallel n$

Prove: $\angle 3 + \angle 5 = 180°$

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

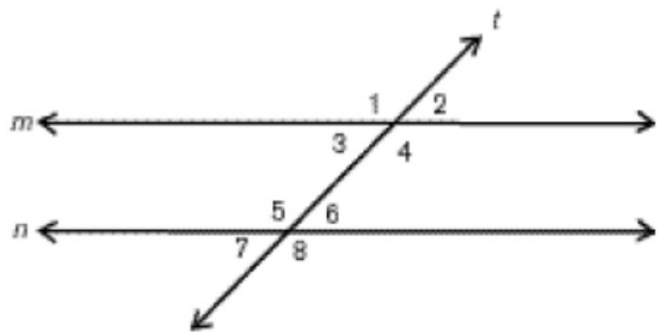
Given m//n, so $\angle 1 \cong \angle 5$ by corresp. angles.

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

By substitution,

$\angle 5 + \angle 3 = 180°$ 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!

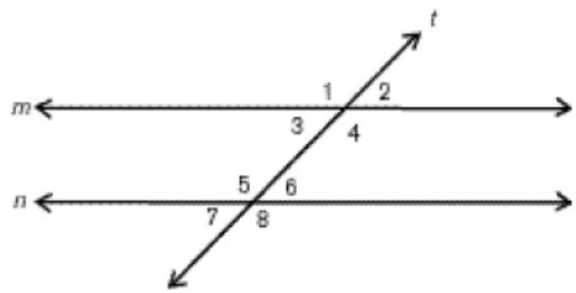
Given $\angle 5 \cong \angle 4$.

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. QED

Task D



Given: $\angle 4 + \angle 6 = 180°$

Prove: $m \parallel n$

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

We are given that $\angle 4 + \angle 6 = 180°$

Since they make a line, $\angle 2 + \angle 4 = 180°$

By substitution,

$$\angle 2 + \angle 4 = \angle 4 + \angle 6$$

$$-\angle 4 \quad -\angle 4$$

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

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