

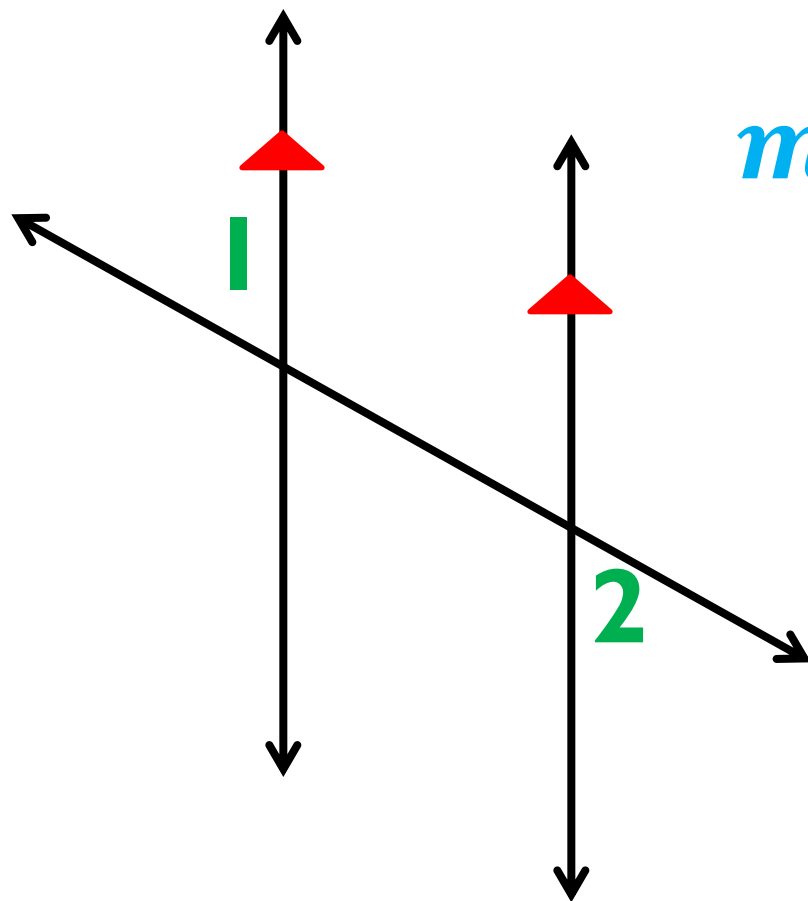
Warmup 2/ (Complement of an 85° angle)

Created by Mr. Lischwe

**WARMUP: COMPARE HOMEWORK
ANSWERS WITH YOUR TABLE!!!**

Get a whiteboard, marker, and eraser!!!

If the measure of angle 1 is 30 degrees, what is the measure of angle 2? **HOW DO YOU KNOW?**

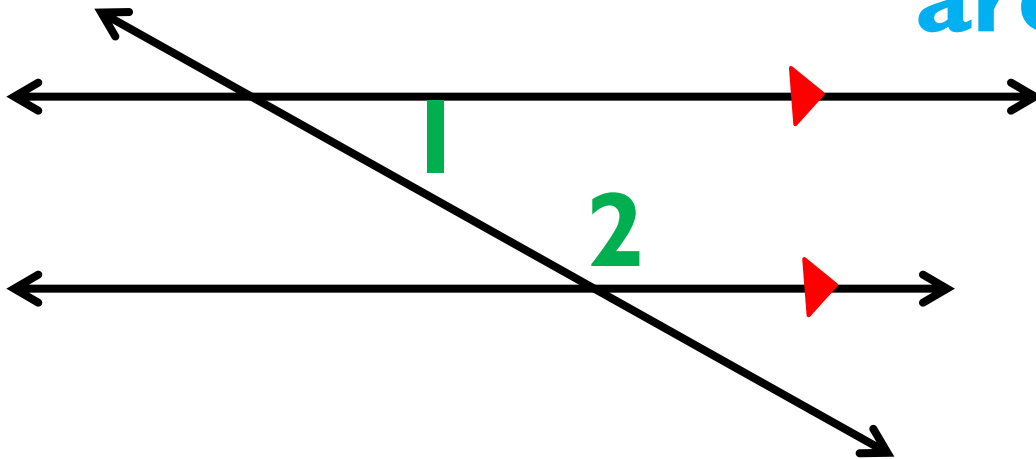


$m\angle 2 = 30^\circ$; they
are alternate
exterior



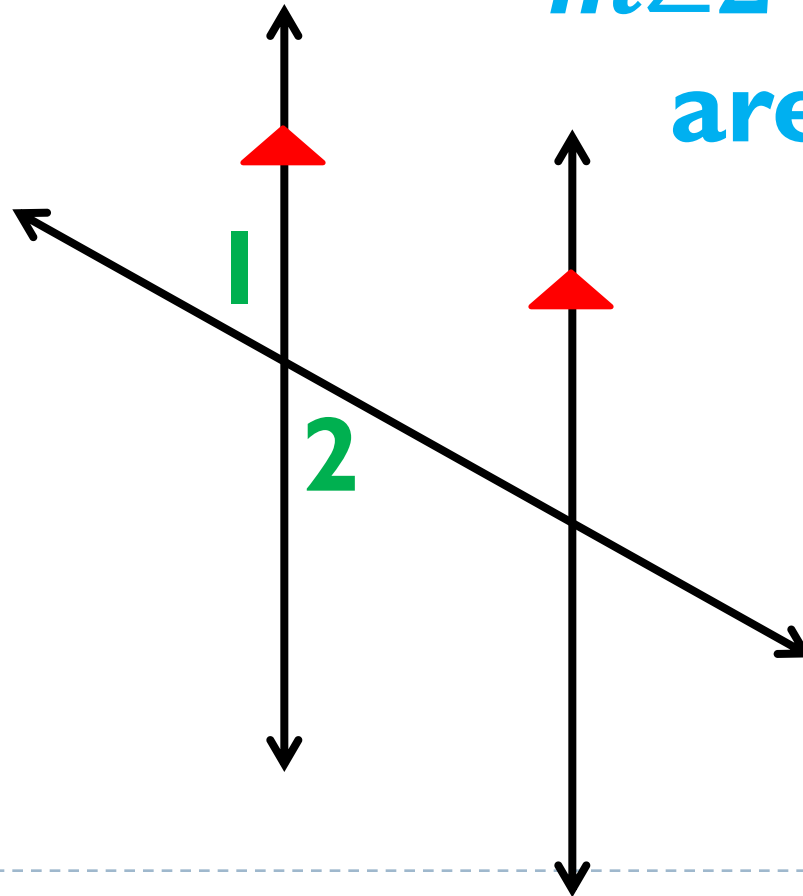
----- If the measure of angle 1 is 45 degrees, what is the measure of angle 2? **HOW DO YOU KNOW?** -----

$m\angle 2 = 135^\circ$; they
are same-side
interior



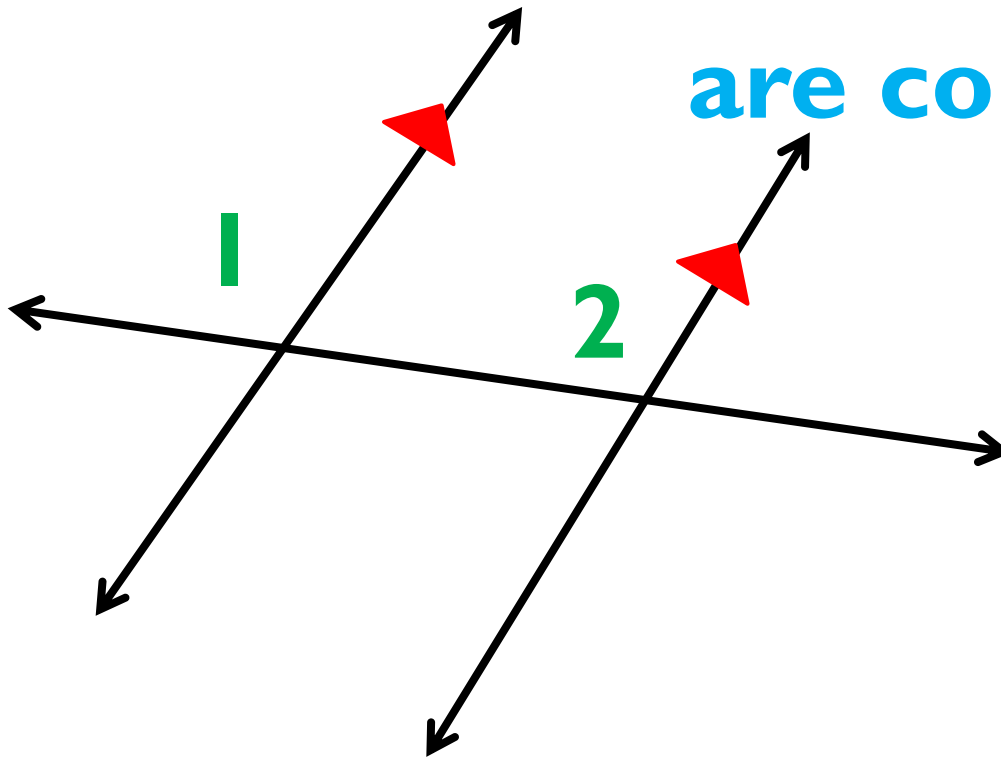
If the measure of angle 1 is 25 degrees, what is the
measure of angle 2? **HOW DO YOU KNOW?**

*$m\angle 2 = 25^\circ$; they
are vertical*



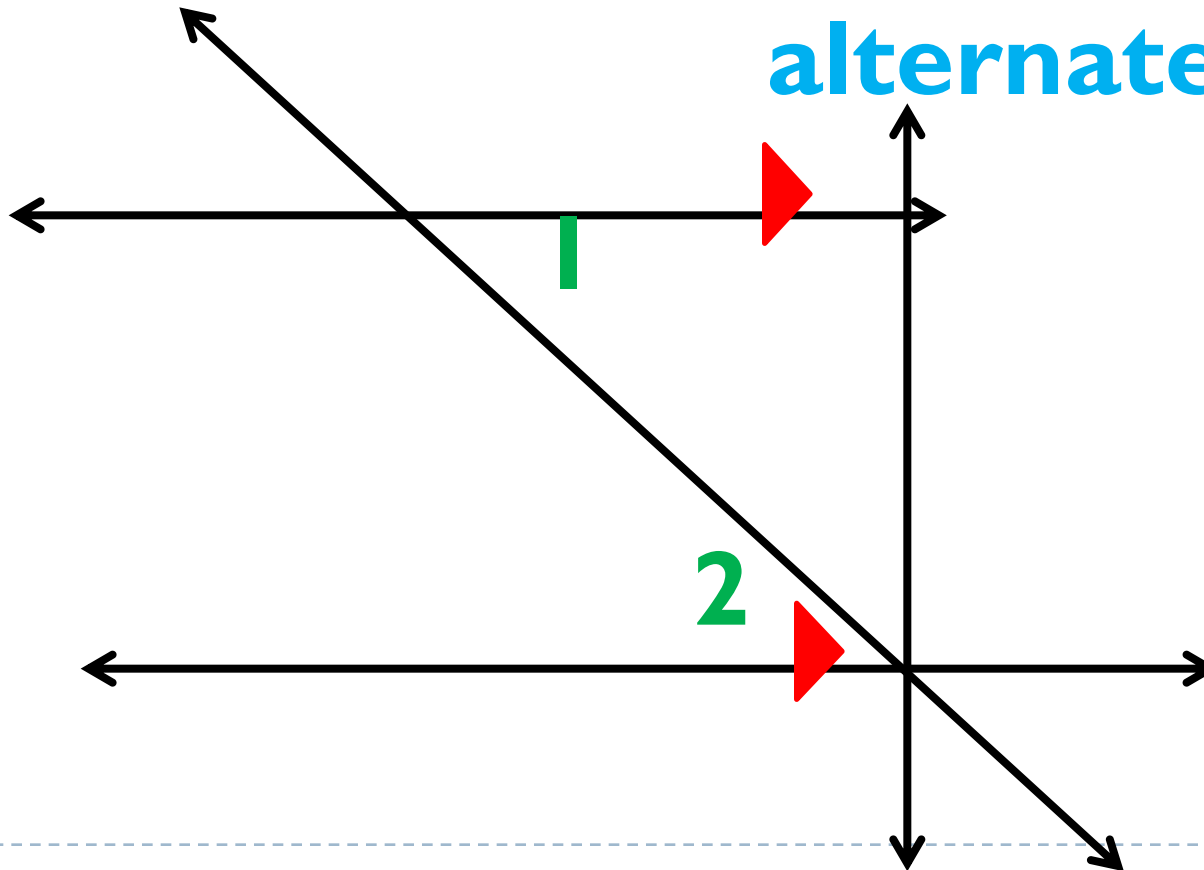
----- If the measure of angle 1 is 115 degrees, what is the measure of angle 2? **HOW DO YOU KNOW?**

$m\angle 2 = 115^\circ$; they are corresponding



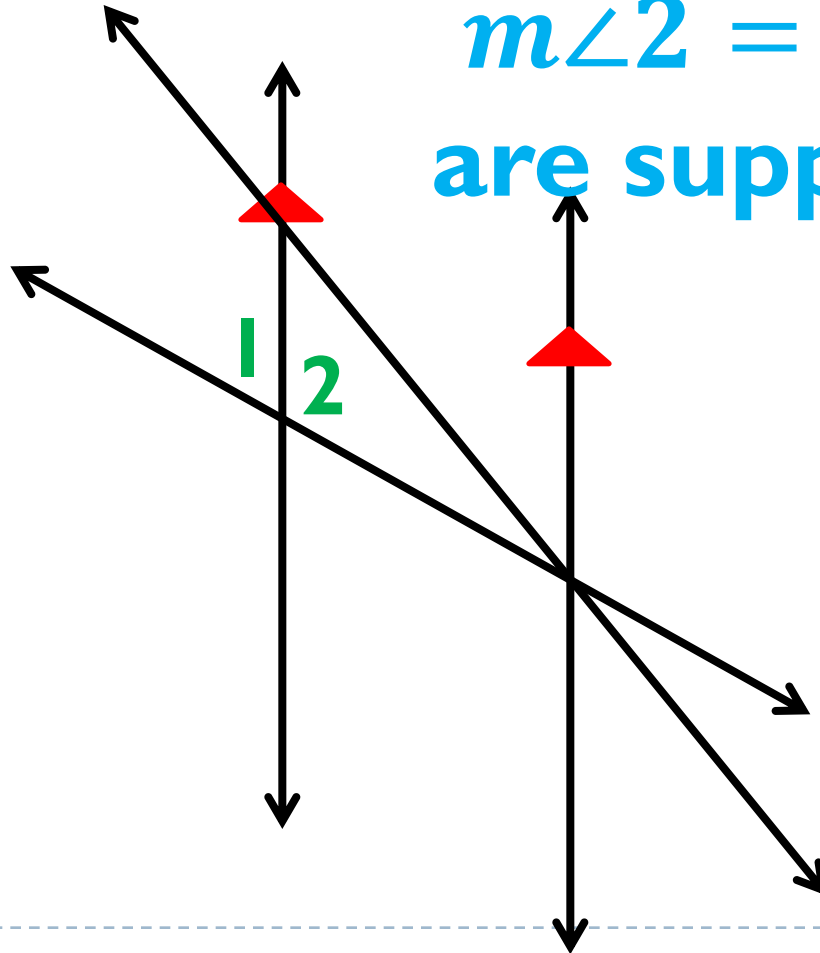
If the measure of angle 1 is 47 degrees, what is the
measure of angle 2? **HOW DO YOU KNOW?**

$m\angle 2 = 47^\circ$; they are
alternate interior

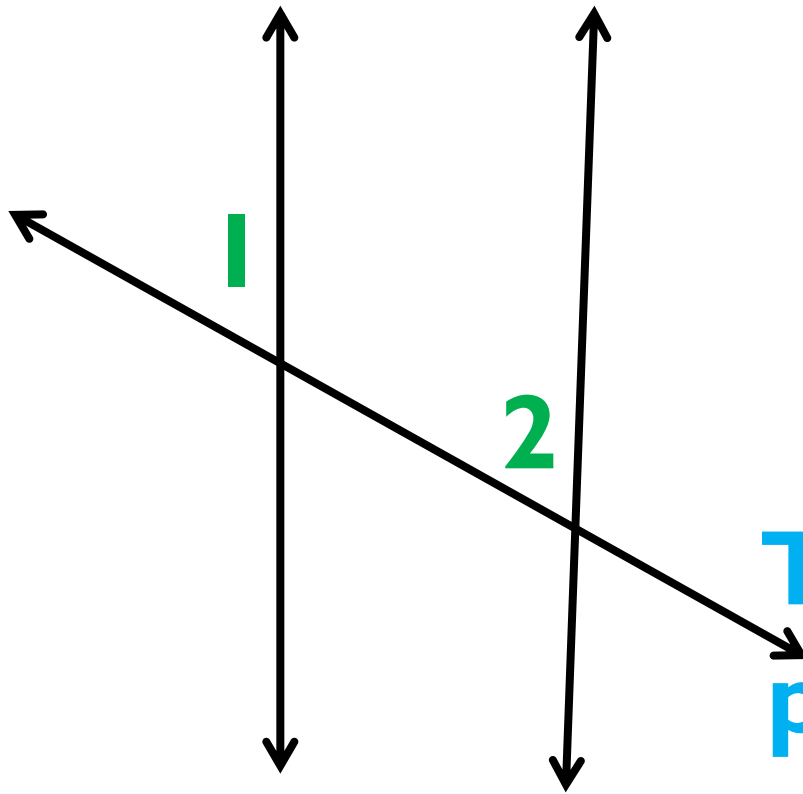


----- If the measure of angle 1 is 41 degrees, what is the measure of angle 2? **HOW DO YOU KNOW?** -----

$m\angle 2 = 139^\circ$; they are supplementary



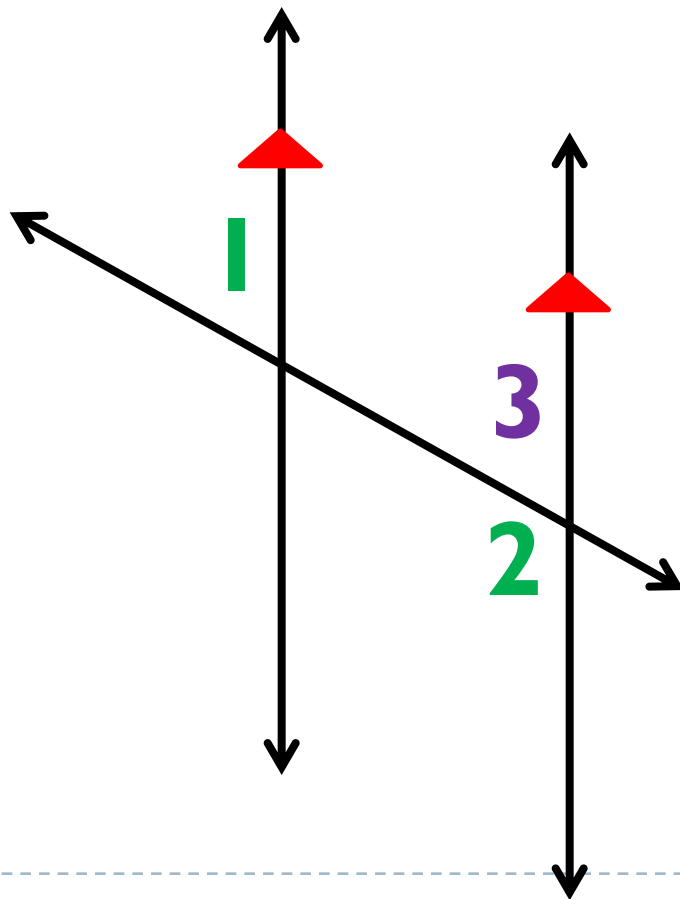
----- If the measure of angle 1 is 41 degrees, what is the measure of angle 2? **HOW DO YOU KNOW?** -----



**TRICK
QUESTION:
These lines aren't
parallel. We don't
know!**



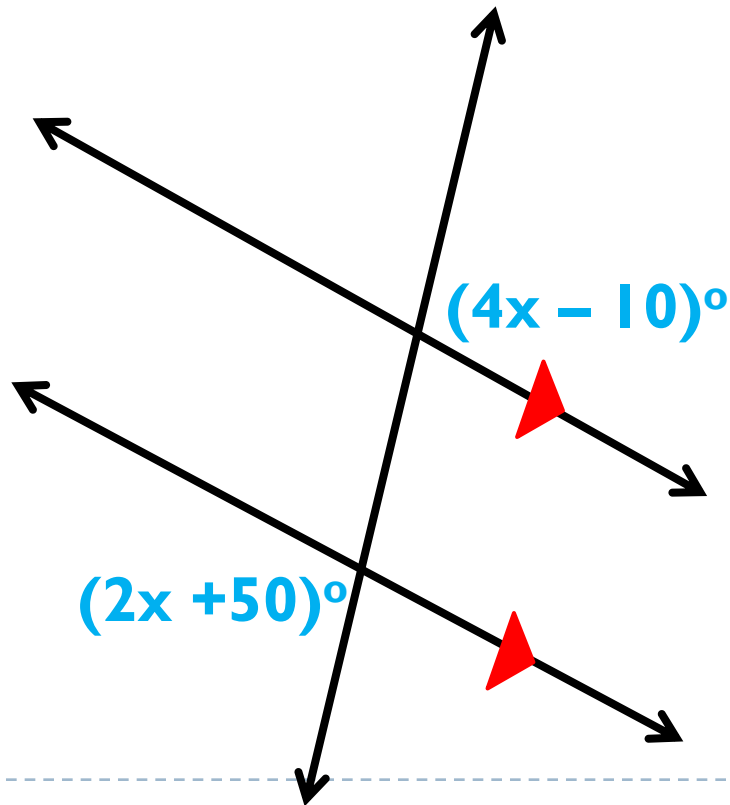
If the measure of angle 1 is 40 degrees, what is the
measure of angle 2? **HOW DO YOU KNOW?**



$m\angle 2 = 140^\circ$;
angle 3 is 40
degrees because
it corresponds to
angle 1; angle 2 is
supplementary
with angle 3

With algebra...

- ▶ Find the value of x .



Alt. Ext: congruent

$$2x + 50 = 4x - 10$$

$$x = 30$$

With algebra...

- ▶ Find the measure of both angles.

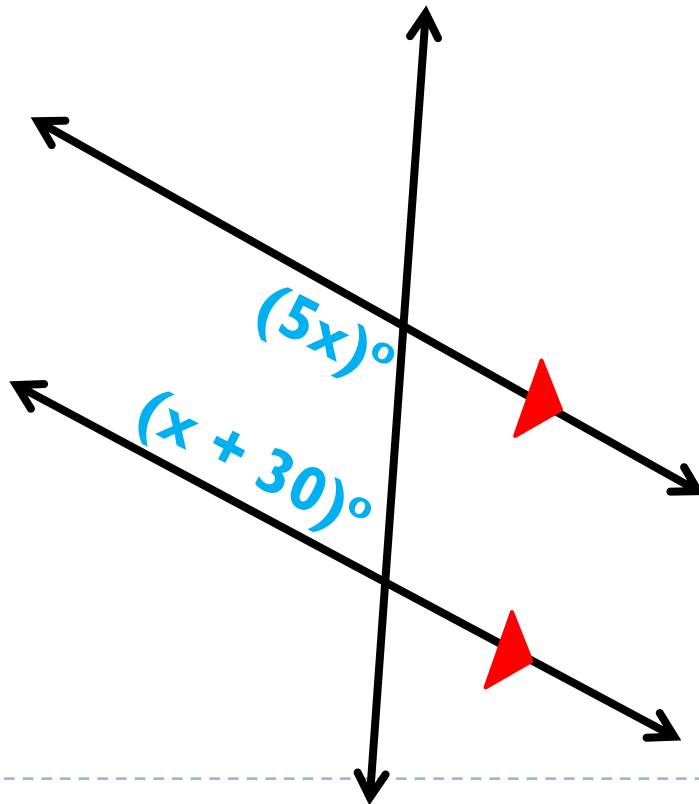
**Same-side interior:
supplementary**

$$(5x) + (x + 30) = 180$$

$$6x + 30 = 180$$

$$x = 25$$

$$55^\circ, 125^\circ$$



Check Homework

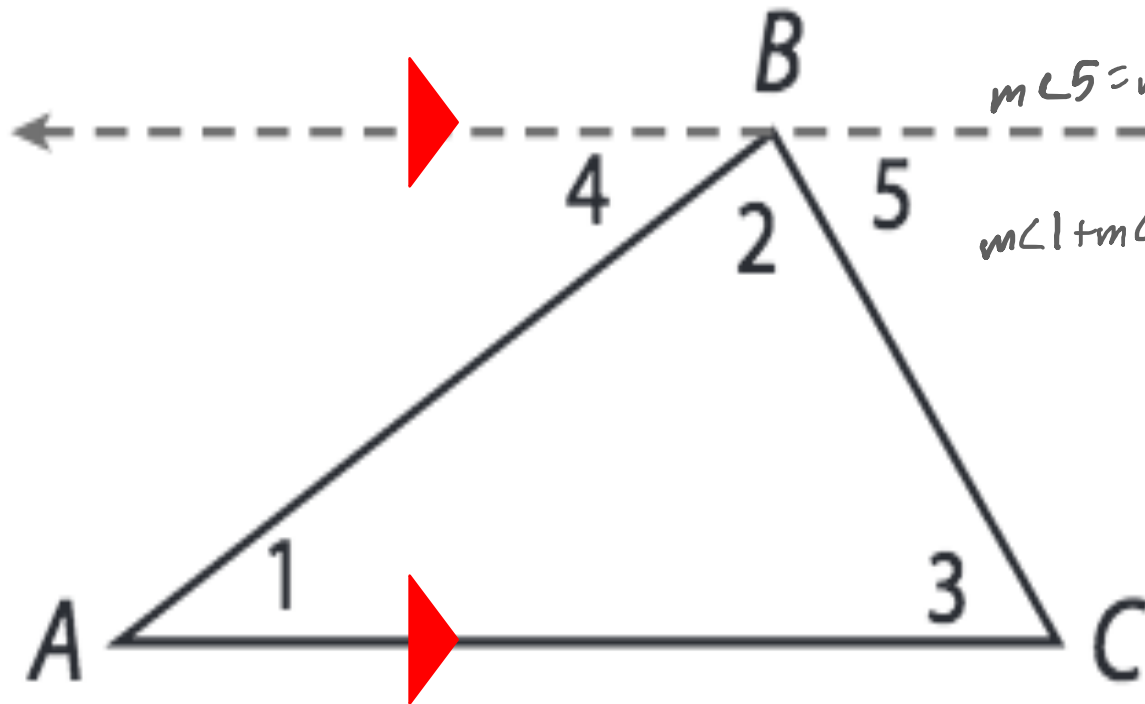
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Objective

Some proofs and Converse of Theorems

PROVING the angle sum of a triangle with parallel lines...



$$m\angle 4 + m\angle 2 + m\angle 5 = 180^\circ$$

Def. of a straight angle

$$m\angle 4 = m\angle 1$$

Alt. Int. Angles Theorem

$$m\angle 5 = m\angle 3$$

"

$$m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$$

Substitution

What is the **converse** of a theorem?

A statement formed by interchanging what is given in a theorem and what is to be proved



Converse

Switch the If and
Then Statements!

A statement and its converse

“If **two angles are a linear pair**,
then **they are supplementary**.”

The converse:

“If **two angles are supplementary**,
then **they are a linear pair**.”

Can you come up with another if-then statement that is true but the converse would be false?

Can you come up with one where the converse is also true?

Would the converse be true?

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

■ “If two angles are congruent, then they are vertical”

False

■ If an angle is acute, then its supplement is obtuse.

■ “If an angle’s supplement is obtuse, then the angle is acute.”

True

■ If you add two even numbers, then their sum will be even.

■ “If the sum of two numbers is even, then the two numbers are even.”

False

Give the converse of each statement.

1. If $a = b$, then $a + c = b + c$.

If $a + c = b + c$, then $a = b$.

2. If $m\angle A + m\angle B = 90^\circ$, then $\angle A$ and $\angle B$ are complementary.

If $\angle A$ and $\angle B$ are complementary, then $m\angle A + m\angle B = 90^\circ$.

3. If $AB + BC = AC$, then A , B , and C are collinear.

If A , B , and C are collinear, then $AB + BC = AC$.

Same Side Interior Angles Postulate:

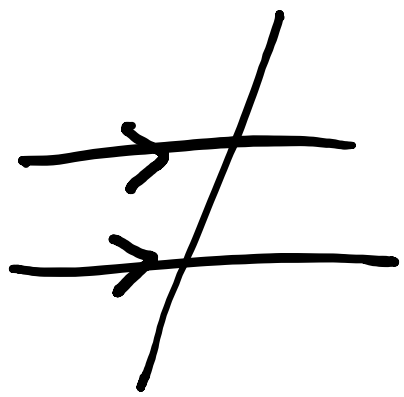
If two parallel lines are cut by a transversal, then the pairs of same-side interior angles are supplementary

Converse of the Same Sides Interior Angles Theorem

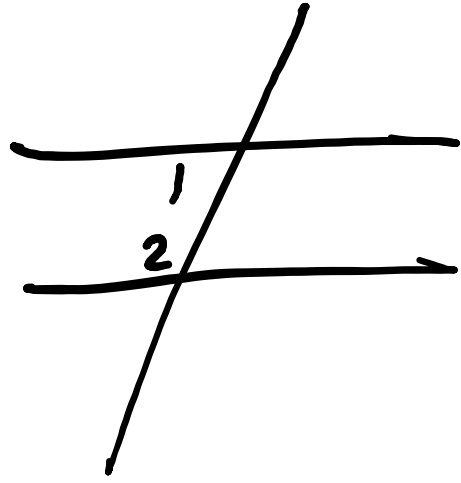
If two lines are cut by a transversal so that a pair of same-side interior angles are supplementary, then the lines are parallel

Same Side Interior Angles Postulate

If



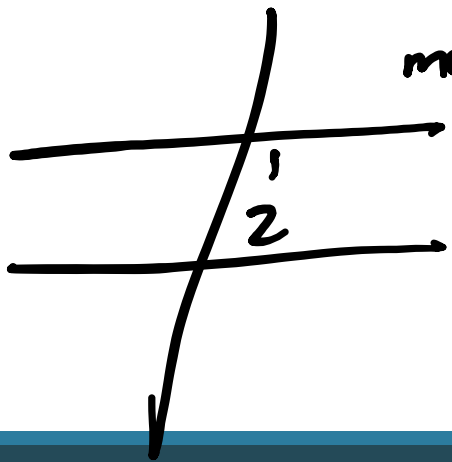
then



$$m\angle 1 + m\angle 2 = 180$$

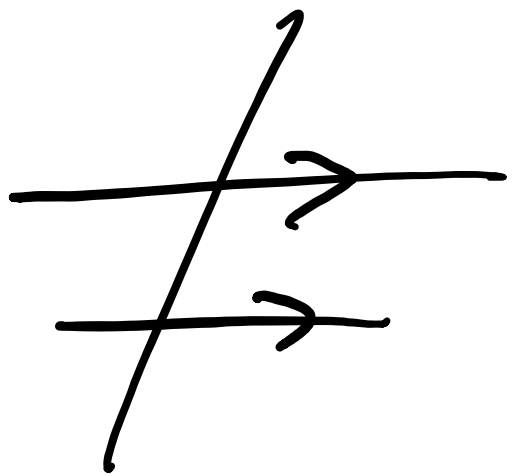
CONVERSE

If



$$m\angle 1 + m\angle 2 = 180$$

then



Corresponding Angles Postulate

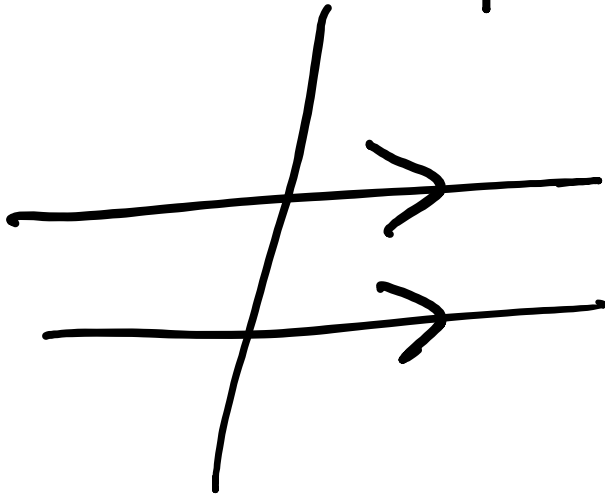
If two parallel lines are cut by a transversal, then the pairs of corresponding angles have the same measure

Converse of the Corresponding Angles Postulate

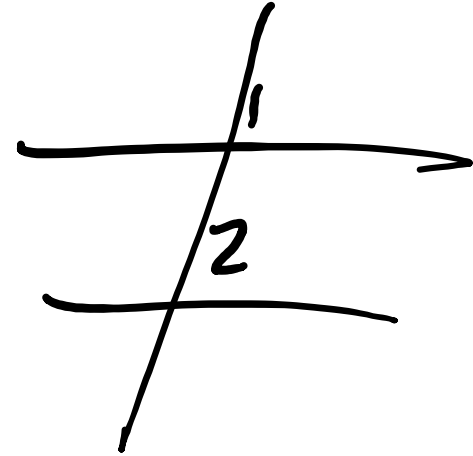
If two lines are cut by a transversal so that any pair of corresponding angles are congruent, then the lines are parallel.

Corresponding \angle s Theorem

If



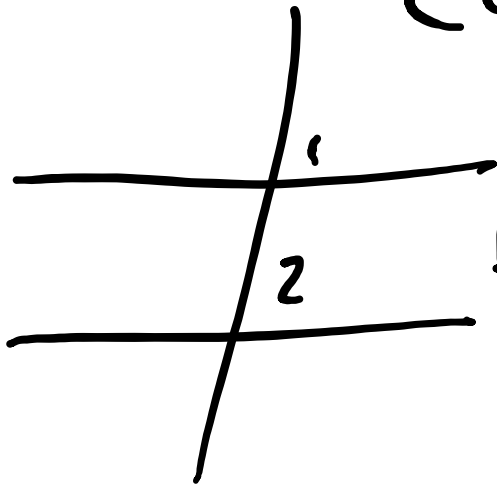
then



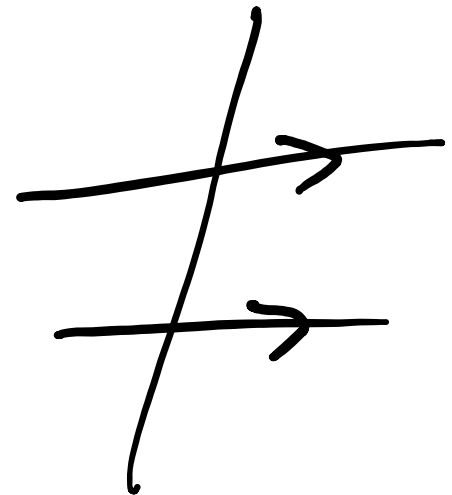
$\angle 1 \cong \angle 2$

Converse

If



$\angle 1 \cong \angle 2$, then

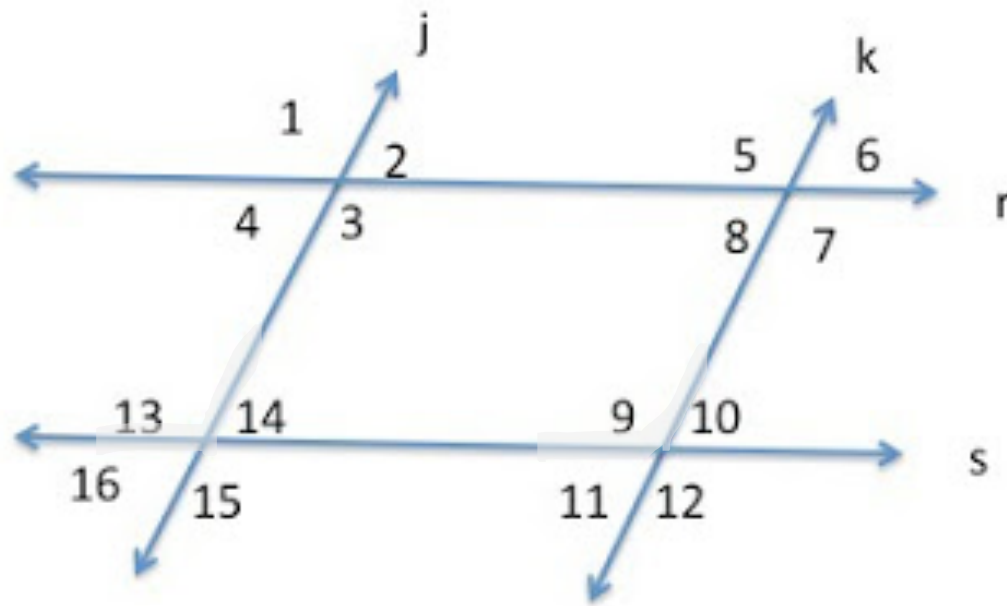


Converse of the Alternate Interior Angles Theorem

If two lines are cut by a transversal so that any pair of alternate interior angles are congruent, then the lines are parallel.

Converse of the Alternate Exterior Angles Theorem

If two lines are cut by a transversal so that any pair of alternate exterior angles are congruent, then the lines are parallel.



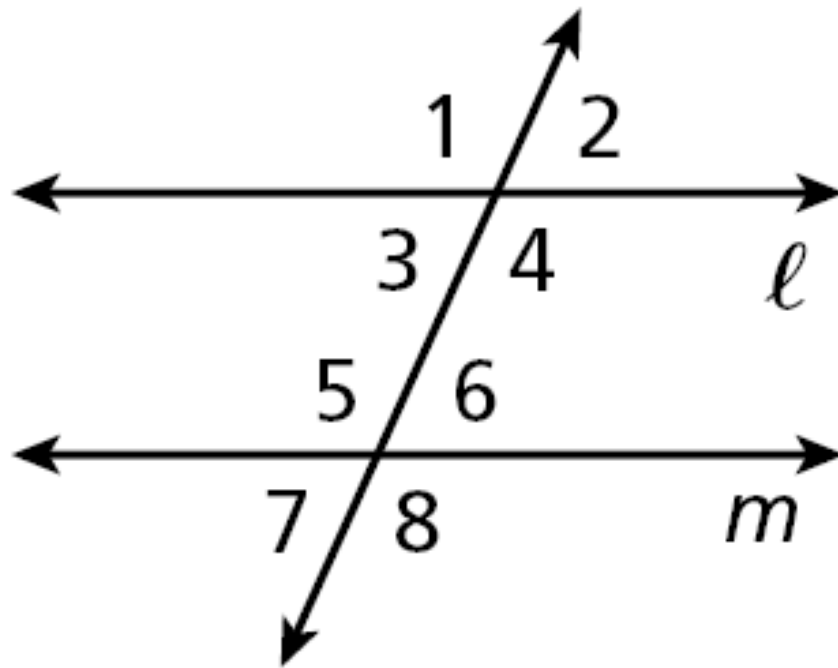
Which lines are parallel if $\angle 9 \cong \angle 13$?

$j \parallel k$

Is $\ell \parallel m$? Explain using a converse.

$$m\angle 3 = (4x - 80)^\circ,$$

$$m\angle 6 = (3x - 50)^\circ, x = 30$$



$$m\angle 3 = 4 \cdot 30 - 80 = 120 - 80 = 40^\circ$$

$$m\angle 6 = 3 \cdot 30 - 50 = 90 - 50 = 40^\circ$$

Yes; $\ell \parallel m$

Homework

Parallel Lines WS II