Name: Key

Date: _____

UNIT 1B

LESSON 14

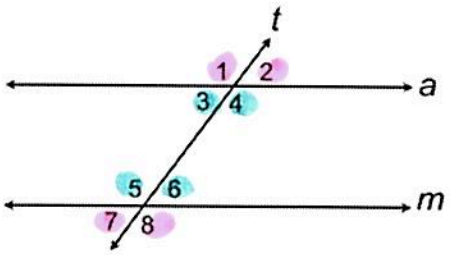
AIM: WHAT IS THE RELATIONSHIP BETWEEN TRANSVERSALS AND PARALLEL LINES?

WORD	DEFINITION
Parallel Lines	Two lines which never touch
Angle Congruence	angles that have the same measure

TOPIC #1: LINES AND TRANSVERALS

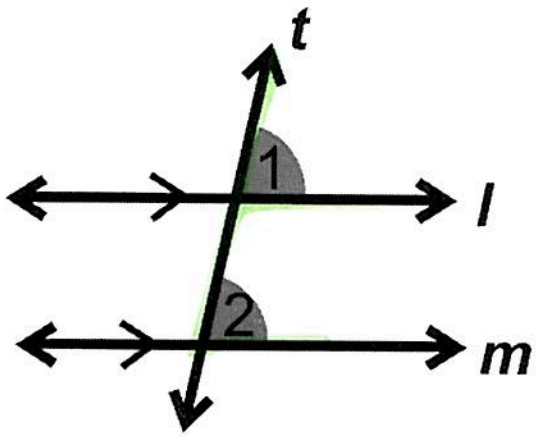
- A transversal is a line that crosses two (or more) lines.
- Transversals create 8 angles, four at each intersection.
- interior angles fall between the two parallel lines
- exterior angles fall outside the two parallel lines.

Given- $a \parallel m$ with transversal t



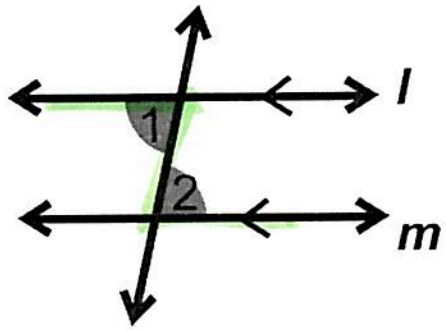
TOPIC #2: CORRESPONDING ANGLES

- Angles that are in the same location at each intersection are called corresponding angles.
- **LOOK FOR LETTER:** F
- *Corresponding Angles Postulate*: If parallel lines are cut by a transversal, then corresponding angles are congruent



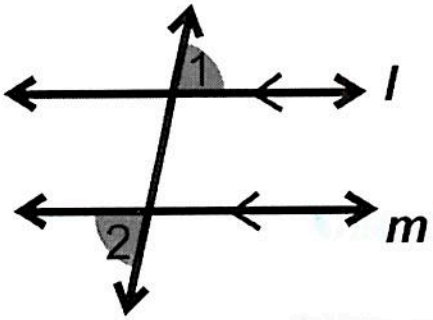
TOPIC #3: ALTERNATE INTERIOR ANGLES

- Angles that are on opposite sides of the transversal and on the interior of the lines are called alternate interior angles
- **LOOK FOR LETTER:** Z
- *Alternate Interior Angles Postulate:* If parallel lines are cut by a transversal, then alternate interior angles are congruent.



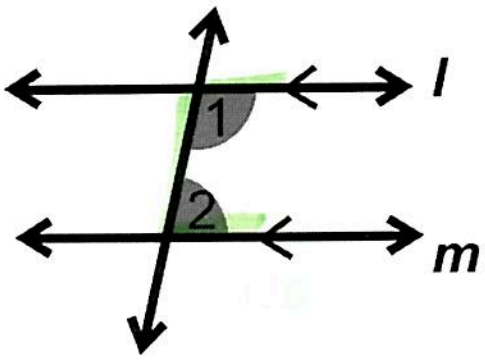
TOPIC #4: ALTERNATE EXTERIOR ANGLES

- Angles that are on opposite sides of the transversal and on the exterior of the lines are called alternate exterior angles.
- *Alternate Exterior Angles Theorem:* If parallel lines are cut by a transversal, then alternate exterior angles are congruent



TOPIC #5: SAME SIDE INTERIOR ANGLES

- Angles that are on the same side of the transversal and on the interior of the lines are called sameside interior angles
- **LOOK FOR LETTER:** C
- Same side interior angles are supplementary!

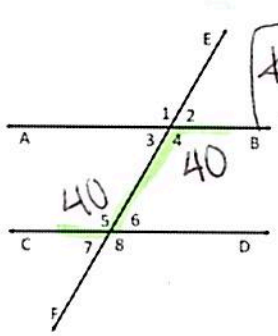


LESSON SUMMARY!

A Transversal is a line that crosses two or more lines.	
Angle Pairs Formed	**Relation when lines are parallel**
Corresponding	Congruent
Alternate Interior	Congruent
Alternate Exterior	Congruent
Same Side Interior	Supplementary

Practice: For examples #'s 1-4, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ and these lines are cut by transversal $\overleftrightarrow{EF}$.

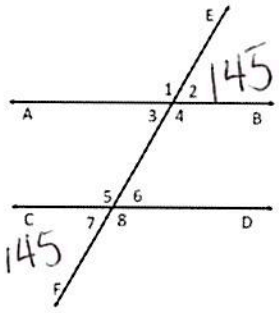
1) If $m\angle 4 = 40^\circ$, what is the measure of $\angle 5$?



$\measuredangle 5 = 40^\circ$

alt. int $\measuredangle$'s are $\cong$

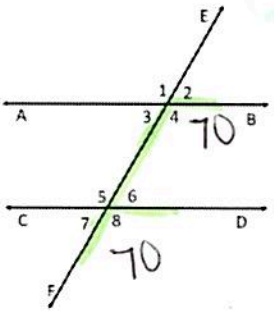
2) If $m\angle 2 = 145^\circ$, what is the measure of $\angle 7$?



$\measuredangle 7 = 145^\circ$

alt. ext. $\measuredangle$'s are $\cong$

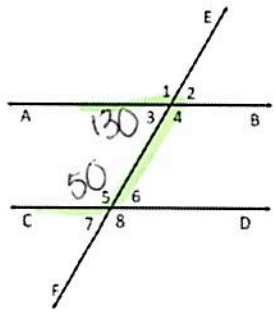
3) If $m\angle 4 = 70^\circ$, what is the measure of $\angle 8$?



$\measuredangle 8 = 70^\circ$

corresponding $\measuredangle$'s are $\cong$

4) If $m\angle 3 = 130^\circ$, what is the $m\angle 5$?

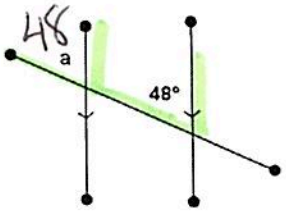


$\measuredangle 5 = 50^\circ$

same side interior $\measuredangle$'s are supp.

5. In each exercise below, find the unknown (labeled) angles. Give reasons for your solutions.

a)

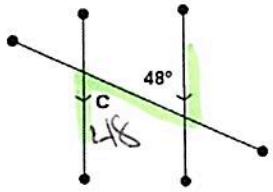


$m\angle a =$ 48°

Reason:

corresponding $\measuredangle$'s are $\cong$

b)

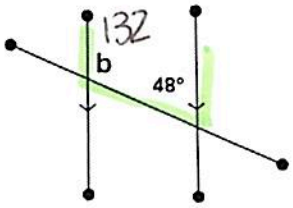


$m\angle c =$ 48°

Reason:

alt. int. $\measuredangle$'s are $\cong$

c)



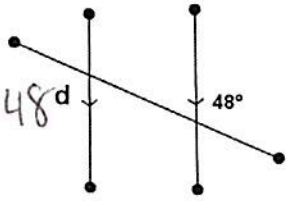
$180 - 48 = 132^\circ$

$m\angle b =$ 132°

Reason:

same side int. $\measuredangle$'s are supplementary

d)



$m\angle d$ 48°

Reason:

alt. ext. $\measuredangle$'s are $\cong$

6. If m<6 = 2x + 20, and m<3 = 4x + 10, find the following:

a) $m\angle 1$ = 150° b) $m\angle 7$ = 30°

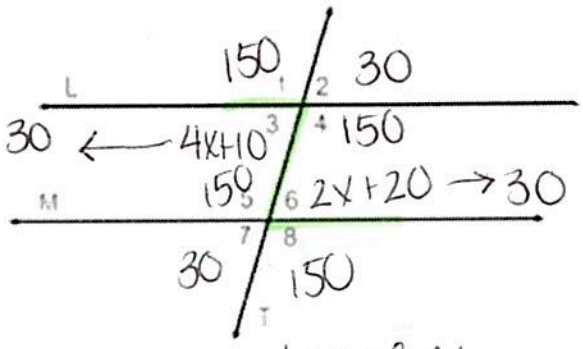
$4x+10 = 2x+20$

$-2x-10 \quad -2x-10$

$2x = 10$

$x = 5$

$4(5)+10 = 30 \quad 2(5)+20 = 30$



7. If $m\angle 1 = x+1$ and $m\angle 6 = 2(x+1)$, what must $m\angle 5$ be so the lines *m* and *n* are parallel?

$x+1+2(x+1) = 180$

$x+1+2x+2 = 180$

$3x+3 = 180$

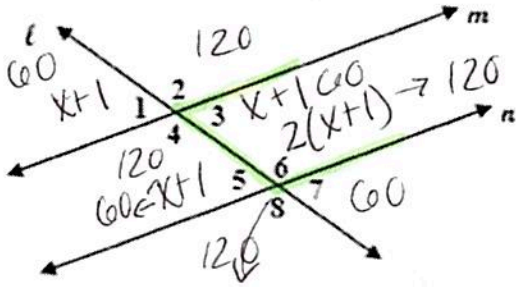
$3x = 177$

$x = 59$

$(59)+1 = 60$

$2(59)+1 = 120$

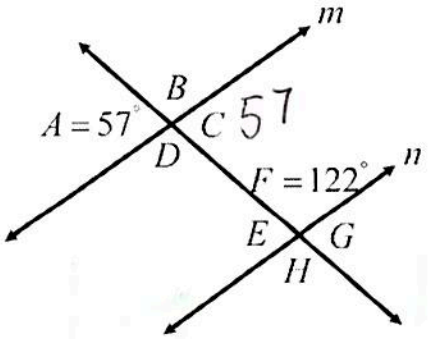
$\angle 5 = 60°$



8. Are lines *m* and *n* parallel? **Explain** your answer!

$122+57 = 179$

NO! m and n are not ||
b/c the same side int. ∠'s do not add to 180°

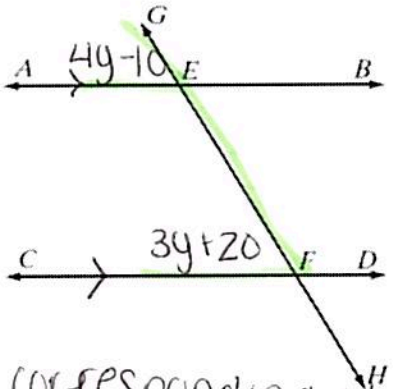


9. $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ and these lines are cut by transversal $\overleftrightarrow{GH}$ at points *E* and F. If $m\angle CFE = 3y+20$ and $m\angle AEG = 4y-10$, find the value of *y*.

$4y-10 = 3y+20$

$-3y+10 \quad -3y+10$

$y = 30$



Name: Key

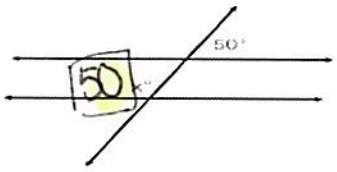
Date:

UNIT 1B

LESSON 14

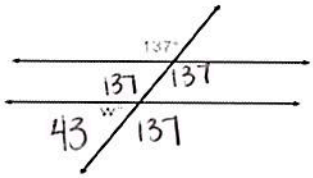
HOMEWORK

1) Solve for *x*



alt. int. ∠'s are ≅

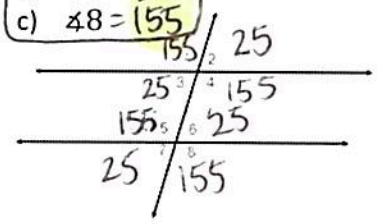
2) Solve for *w*



180 − 137 = **43°**

3) If the measure of ∠3 is 25, find the following:

a) ∠2 = 25
b) ∠6 = 25
c) ∠8 = 155



4) Solve for x

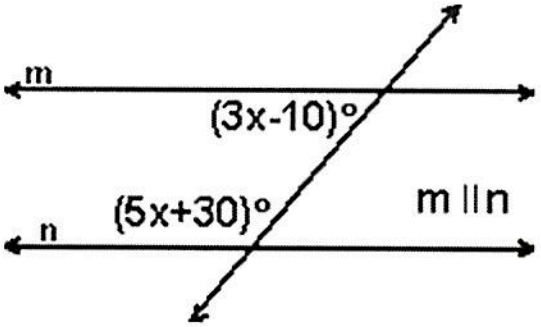
same side int. ∠'s are supp.

$3x - 10 + 5x + 30 = 180$

$8x + 20 = 180$

$8x = 160$

$x = 20$



For Exercises 5-8, use the figure at the right.

5) Find the value of *x*.

$9x - 5 = 58$

$+5 \quad +5$

$9x = 63$

$x = 7$

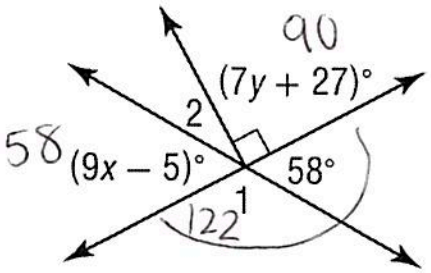
vertical ∠'s are ≅

6) Find $m\angle 1$.

122°

180 − 58 = 122

linear pairs are supp.



7) Find $m\angle 2$.

360 − (58 + 90 + 58 + 122)

32°

∠'s at a point sum to 360°

8) Find the value of *y*.

$7y + 27 = 90$

$-27 \quad -27$

$7y = 63$

$y = 9$

$7(9) + 27 = 90$