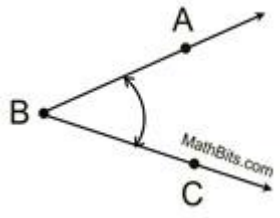
Math 2 Name: Key

Unit 4A Day 2 Notes – Parallel Lines & Angle Relationships Date:_____

Geometric Symbols & Labeling:

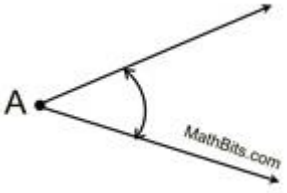
Geometric Symbol	Interpretation	Example
$\angle$ or $\measuredangle$ or $\sphericalangle$	Angle	$\measuredangle ABC$
$\triangle$ or Δ	Triangle	ΔDEF
capital letter	Point	point A
$\leftrightarrow$	Line	$\overleftrightarrow{AB}$
———	Line Segment	$\overline{AB}$
$\rightarrow$ or $\leftarrow$	Ray	$\overrightarrow{AB}$ or $\overrightarrow{CD}$
$\parallel$	Parallel	$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$
$\perp$	Perpendicular	$\overline{AB} \perp \overline{CD}$
$\cong$	Congruent	$\overline{AB} \cong \overline{CD}$
$\sim$	Similar	$\Delta ABC \sim \Delta DEF$

Angles:



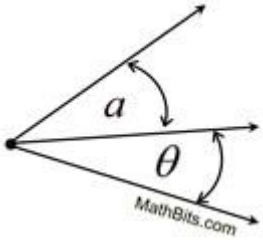
$\measuredangle ABC$ or $\measuredangle CBA$

Angles are labeled by specifying 3 points, with the center point being the vertex of the angle. This angle is NOT $\angle BAC$.



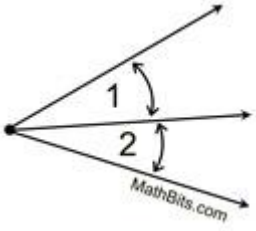
$\measuredangle A$

Angles may be labeled with a single letter at the vertex, as long as it is perfectly clear that there is only one angle at this vertex.



$\measuredangle a$ and $\measuredangle \theta$

Angles may be represented by a single lower case letter or by a Greek letter, as long as it is clear which angle is being referenced.

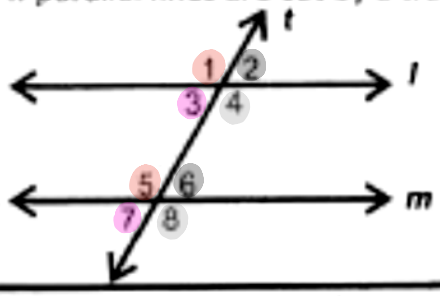


$\measuredangle 1$ and $\measuredangle 2$

Angles may also be represented by numbers, as long as it is clear to which angle the number applies.

Parallel Lines Angle Pair Relationships:

If parallel lines are cut by a transversal, then **corresponding angles** are *congruent*.



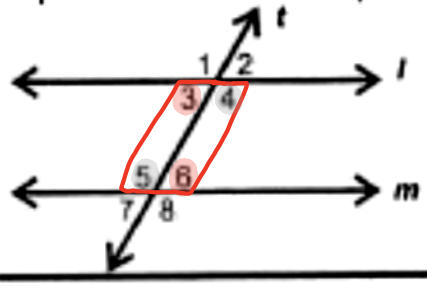
$\angle 1 \cong \angle 5$

$\angle 4 \cong \angle 8$

$\angle 2 \cong \angle 6$

$\angle 3 \cong \angle 7$

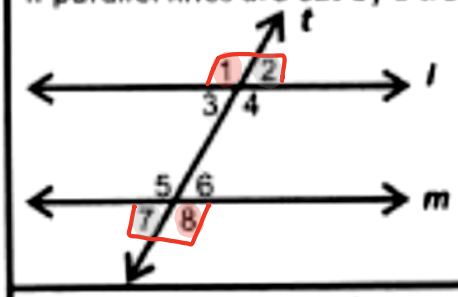
If parallel lines are cut by a transversal, then **alternate interior angles** are *congruent*.



$\angle 3 \cong \angle 6$

$\angle 4 \cong \angle 5$

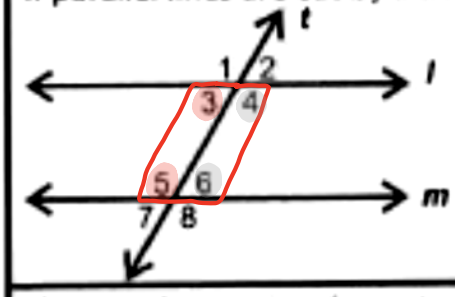
If parallel lines are cut by a transversal, then **alternate exterior angles** are *congruent*.



$\angle 1 \cong \angle 8$

$\angle 2 \cong \angle 7$

If parallel lines are cut by a transversal, then **same side interior angles** are *supplementary*. (Adds up to 180°)



$m\angle 3 + m\angle 5 = 180^\circ$

$m\angle 4 + m\angle 6 = 180^\circ$

Linear pairs are *supplementary*.

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

$m\angle 3 + m\angle 4 = 180^\circ$

$m\angle 5 + m\angle 6 = 180^\circ$

$m\angle 7 + m\angle 8 = 180^\circ$

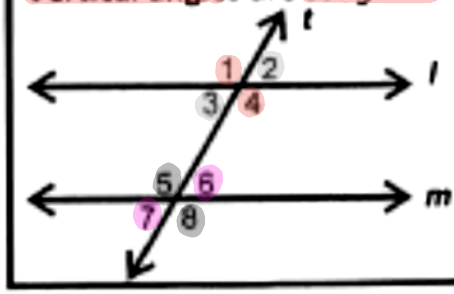
$m\angle 1 + m\angle 3 = 180^\circ$

$m\angle 5 + m\angle 7 = 180^\circ$

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

$m\angle 6 + m\angle 8 = 180^\circ$

Vertical angles are *congruent*.



$\angle 1 \cong \angle 4$

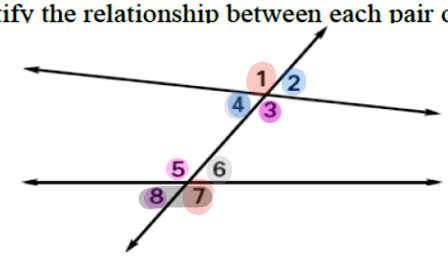
$\angle 3 \cong \angle 2$

$\angle 5 \cong \angle 8$

$\angle 7 \cong \angle 6$

Examples:

5. Identify the relationship between each pair of angles, if any.



1) ∠1 and ∠7
Alt. Ext. ∠'s

2) ∠4 and ∠6
Alt. Int. ∠'s

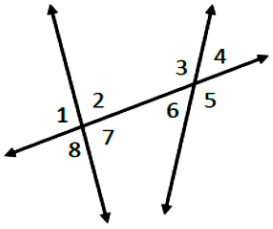
3) ∠8 and ∠7
Linear Pair

4) ∠3 and ∠8
No Relationship

5) ∠3 and ∠5
Alt. Int. ∠'s

6) ∠2 and ∠4
Vertical ∠'s

6. Identify all pairs of the following angles.



a. Corresponding angles
∠1 + ∠3 ∠2 + ∠4
∠8 + ∠6 ∠7 + ∠5

b. Alternate interior angles
∠2 + ∠6 ∠7 + ∠3

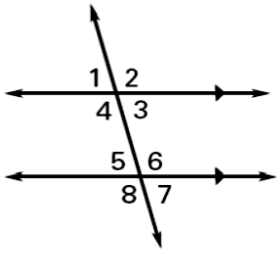
c. Consecutive interior angles
∠2 + ∠3 ∠7 + ∠6

d. Alternate exterior angles
∠1 + ∠5 ∠8 + ∠4

e. Vertical Angles
∠1 + ∠7 ∠3 + ∠5
∠2 + ∠8 ∠6 + ∠3

f. Linear Pairs
∠1 + ∠8 ∠1 + ∠2
∠2 + ∠7 ∠3 + ∠4
∠3 + ∠6 ∠8 + ∠7
∠4 + ∠5 ∠6 + ∠5

Example 3: Use the diagram below to find the angle measures. Explain your reasoning.



1. If the $m\angle 2 = 113°$, what is the $m\angle 6$?
∠2 + ∠6 are Corresponding ∠'s
∠2 ≅ ∠6 m∠6 = 113°

2. If the $m\angle 4 = 100°$, what is the $m\angle 6$?
∠4 + ∠6 are Alt. Int. ∠'s
∠4 ≅ ∠6 m∠6 = 100°

3. If the $m\angle 1 = 84°$, what is the $m\angle 3$?
∠1 + ∠3 are Vertical ∠'s
∠1 ≅ ∠3 m∠3 = 84°

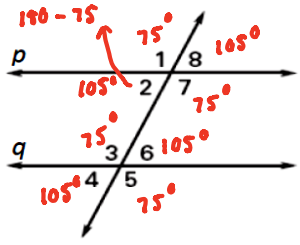
4. If the $m\angle 7 = 75°$, what is the $m\angle 1$?
∠7 + ∠1 are Alt. Ext. ∠'s
∠7 ≅ ∠1 m∠1 = 75°

5. If the $m\angle 3 = 81°$, what is the $m\angle 4$?
∠3 + ∠4 are a Linear Pair
m∠3 + m∠4 = 180 m∠4 = 180 − 81 = 99°

6. If the $m\angle 6 = 111°$, what is the $m\angle 3$?
∠6 + ∠3 are Same Side Int. ∠'s
m∠6 + m∠3 = 180° m∠3 = 180 − 111 = 69°

Example 4: Finding all the angle measures.

If $p \parallel q$ and $m\angle 1 = 75°$, find the measures of all the angles formed by the parallel lines cut by the transversal.

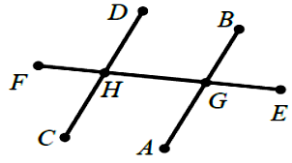


m∠1 = 75° m∠2 = 105°
m∠3 = 75° m∠4 = 105°
m∠5 = 75° m∠6 = 105°
m∠7 = 75° m∠8 = 105°

DO YOU NOTICE A PATTERN???? Describe it!

Example 5: If $\overline{DC} \parallel \overline{BA}$, are the angles congruent or supplementary?

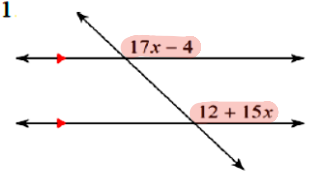
HW



1. ∠DHG and ∠HGA
2. ∠FHC and ∠DHG
2. ∠BGE and ∠FHC
3. ∠EGA and ∠GHC
4. ∠AGH and ∠EGA
5. ∠DHG and ∠BGH

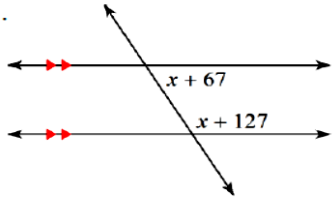
Example 6: Solve for x and explain your reasoning.

1



Corresponding ∠'s (Congruent)
17x − 4 = 12 + 15x
+4 +4
17x = 16 + 15x
−15x −15x
2x = 16
2 2
x = 8

2.



Same Side Int. ∠'s (Supplementary)
x + 67 + x + 127 = 180°
2x + 194 = 180
−194 −194
2x = −14
2 2
x = −7