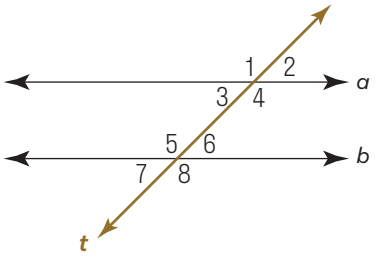
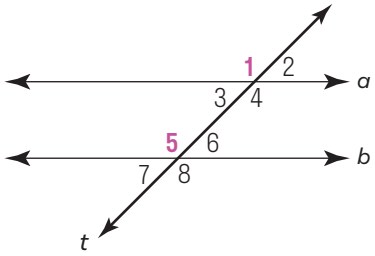
Parallel Lines Cut by a Transversal

A line that intersects two or more other lines is called a **transversal**. For example, **line *t*** is a transversal because it intersects lines *a* and *b*.

Here, lines *a* and *b* are parallel. When a transversal intersects two parallel lines, it creates 8 angles. Some of the angle pairs have special names and relationships.

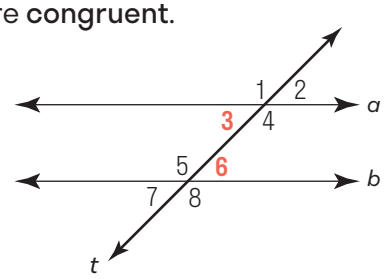


Corresponding angles can be found in matching corners on the same side of the transversal. One pair of these angles below is ∠1 and ∠5. Since lines *a* and *b* are parallel, the corresponding angles are **congruent**.



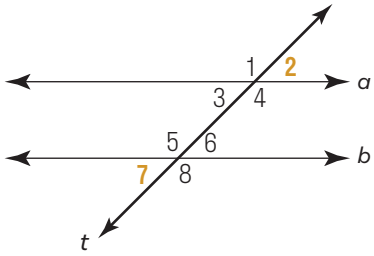
$m\angle 1 = m\angle 5$

Alternate interior angles can be found between the parallel lines on opposite sides of the transversal. One pair of these angles below is ∠3 and ∠6. Since lines *a* and *b* are parallel, the alternate interior angles are **congruent**.



$m\angle 3 = m\angle 6$

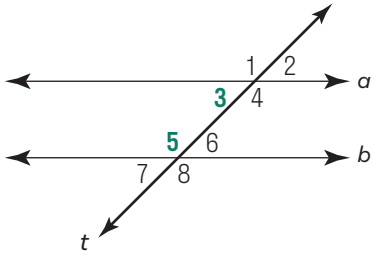
Alternate exterior angles are found outside the parallel lines on opposite sides of the transversal. One pair of these angles below is ∠2 and ∠7. Since lines *a* and *b* are parallel, the alternate exterior angles are **congruent**.



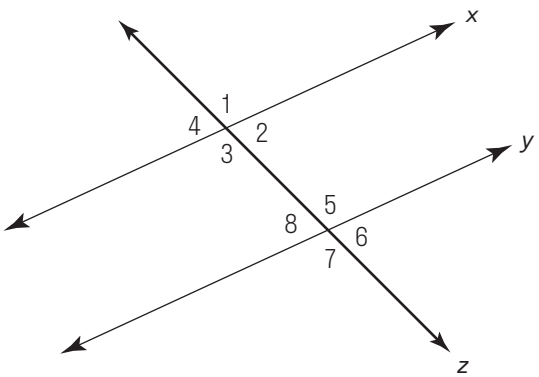
$m\angle 2 = m\angle 7$

Same-side interior angles can be found between the parallel lines on the same side of the transversal. One pair of these angles in this diagram is ∠3 and ∠5. Since lines *a* and *b* are parallel, the same-side interior angles are **supplementary**, meaning their measures add up to 180°.

$m\angle 3 + m\angle 5 = 180°$



In the diagram below, lines *x* and *y* are parallel. Answer each question based on the diagram.



Name a pair of corresponding angles: _____

Name a pair of alternate interior angles: _____

Name a pair of alternate exterior angles: _____

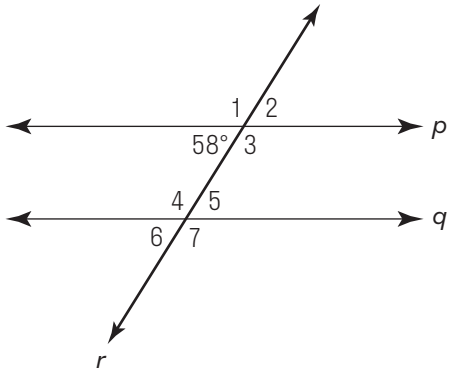
Name a pair of same-side interior angles: _____

Name two angles that are congruent to ∠1: _____

Parallel Lines Cut by a Transversal

Using the diagrams below, find the missing angle measures. Then explain how you found some of the angle measures.

In this diagram, lines p and q are parallel.



$m\angle 1 =$ _____ $m\angle 2 =$ _____

$m\angle 3 =$ _____ $m\angle 4 =$ _____

$m\angle 5 =$ _____ $m\angle 6 =$ _____

$m\angle 7 =$ _____

Explain how you found $m\angle 5$.

_____

_____

_____

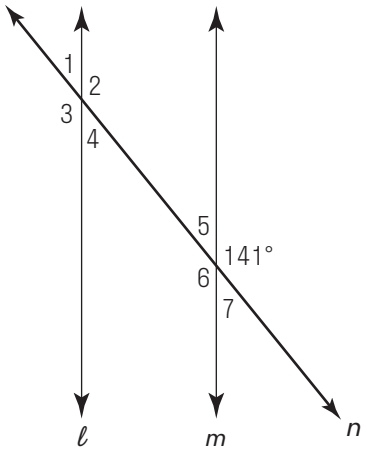
Explain how you found $m\angle 6$.

_____

_____

_____

In this diagram, lines ℓ and m are parallel.



$m\angle 1 =$ _____ $m\angle 2 =$ _____

$m\angle 3 =$ _____ $m\angle 4 =$ _____

$m\angle 5 =$ _____ $m\angle 6 =$ _____

$m\angle 7 =$ _____

Explain how you found $m\angle 1$.

_____

_____

_____

Explain how you found $m\angle 3$.

_____

_____

_____