

Angles & Lines

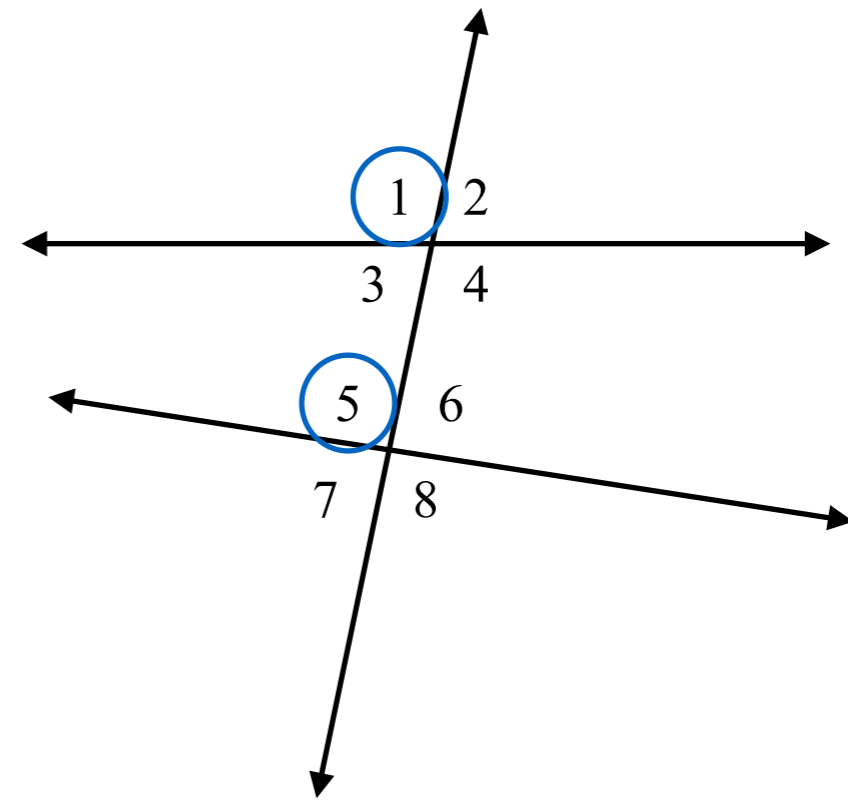
Parallels & Transversals

From Chapters 1 & 2
which angles do we
know are congruent?

$$\left. \begin{array}{l} \angle 1 \cong \angle 4 \\ \angle 2 \cong \angle 3 \\ \angle 5 \cong \angle 8 \\ \angle 6 \cong \angle 7 \end{array} \right\}$$

And how do we
know this?

Vertical Angles
Definition



Transversal – A line that intersects two or more coplanar lines at two different points. The transversal and other two lines form 8 angles with distinct names.

Corresponding Angles – lie on the same side of the transversal, and on the same side of the lines. They occupy corresponding positions.

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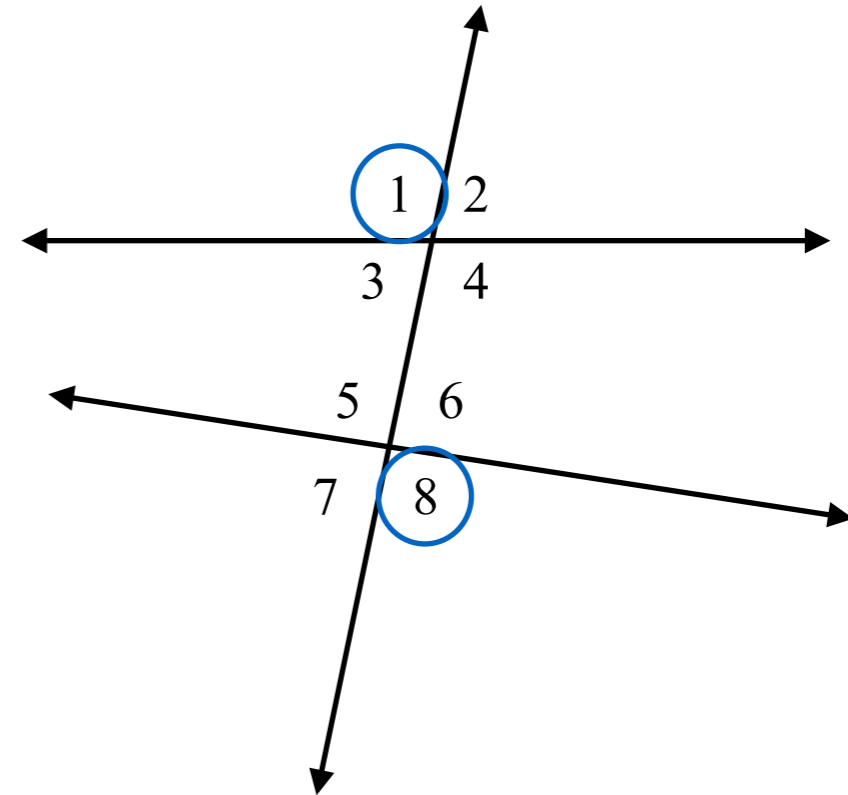
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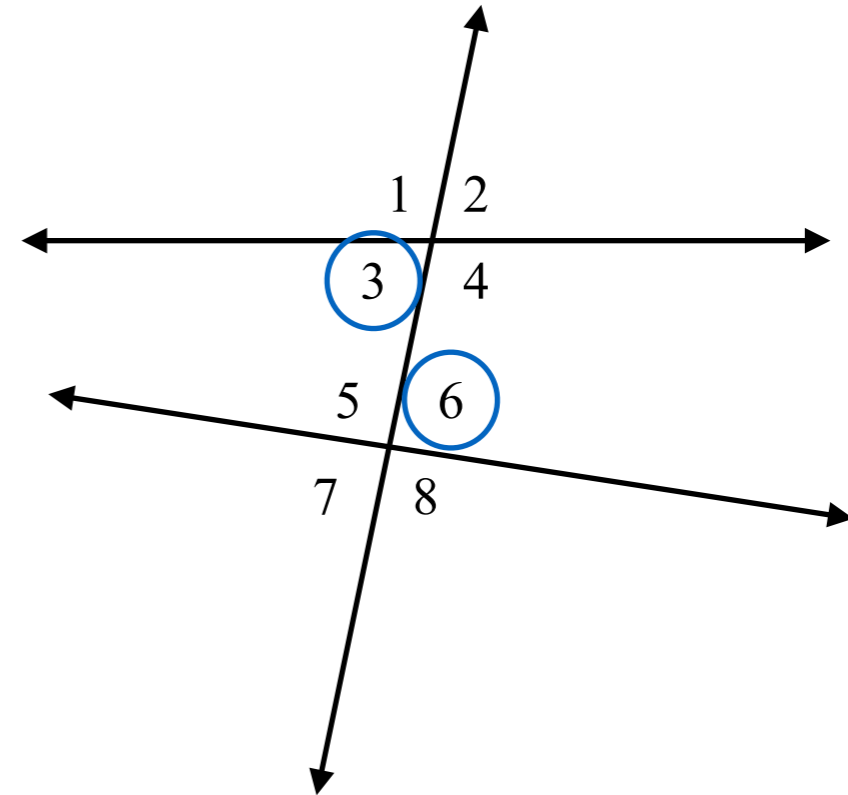
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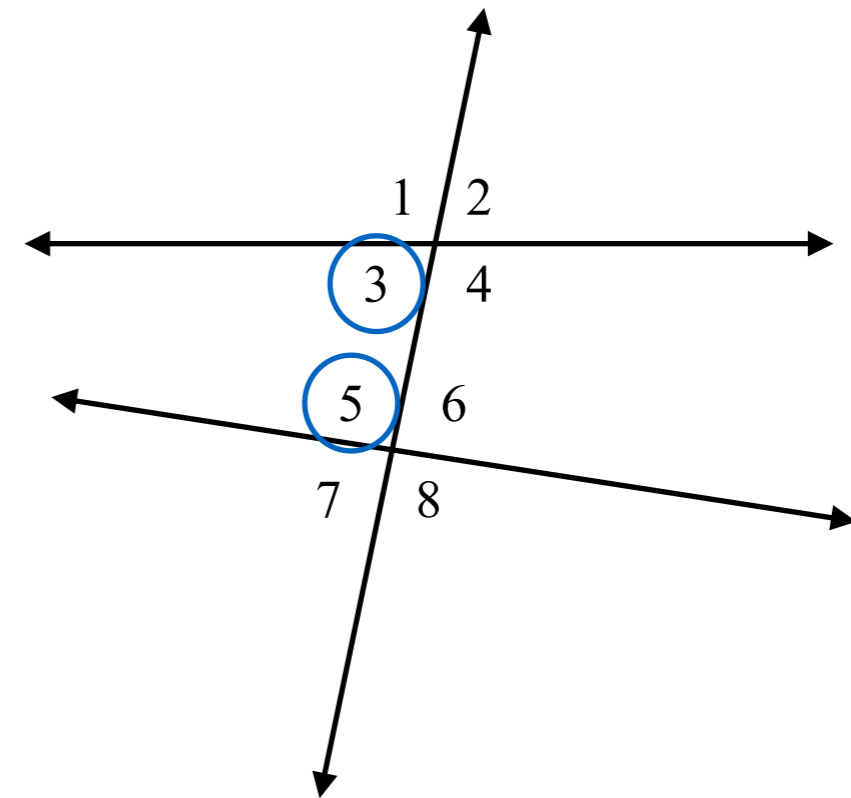
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Alternate Interior Angles – lie on the opposite sides of the transversal, between the two lines

Same-Side Interior Angles – lie on the same side of the transversal, between the two lines
(aka Consecutive Interior Angles)

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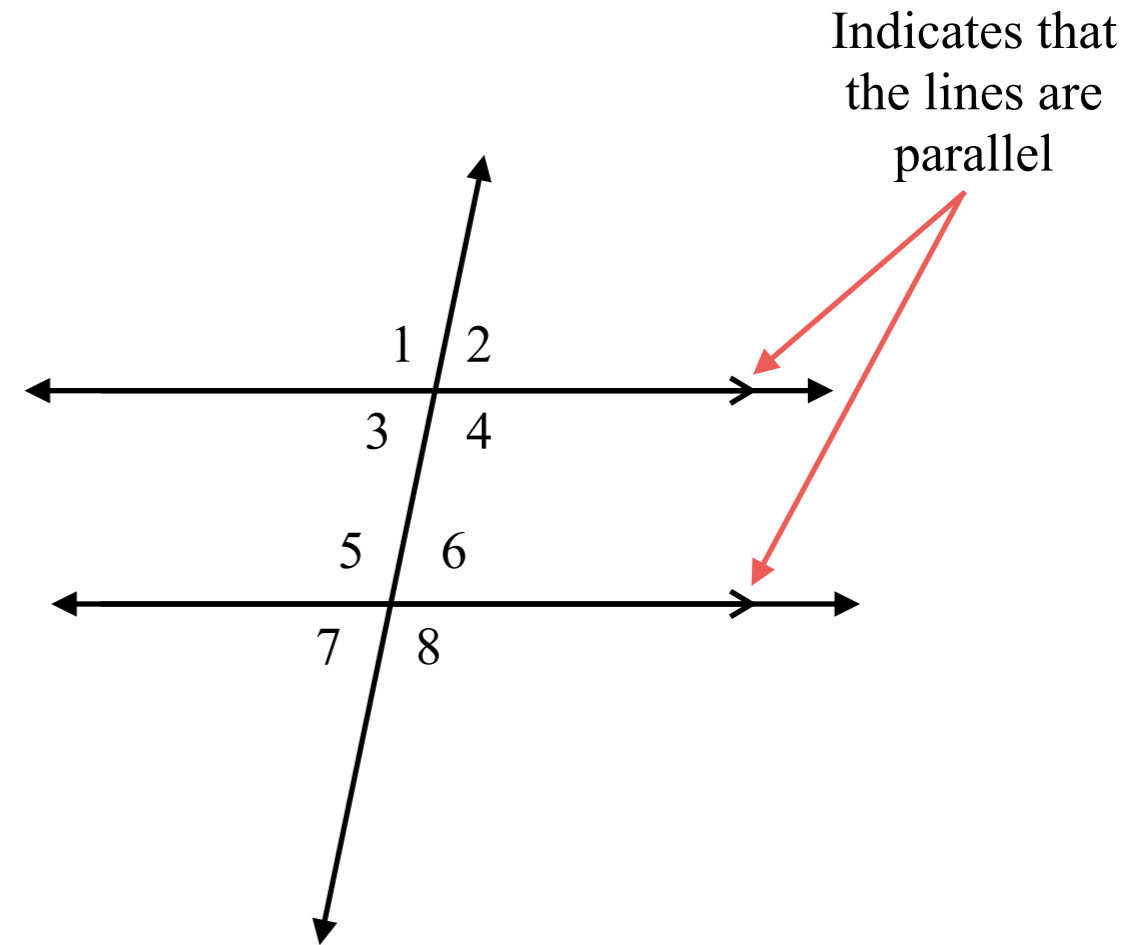
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Vertical Angles
Definition



When the two non-transversals are parallel, they generate identical sets of angle pairs so that...

Remember that the above are true only when the two non-transversals are parallel

Corresponding Angles – are congruent $\angle 1 \cong \angle 5$, $\angle 2 \cong \angle 6$, $\angle 3 \cong \angle 7$, and $\angle 4 \cong \angle 8$

Alternate Exterior Angles – are congruent $\angle 1 \cong \angle 8$, and $\angle 2 \cong \angle 7$

Alternate Interior Angles – are congruent $\angle 3 \cong \angle 6$, and $\angle 4 \cong \angle 5$

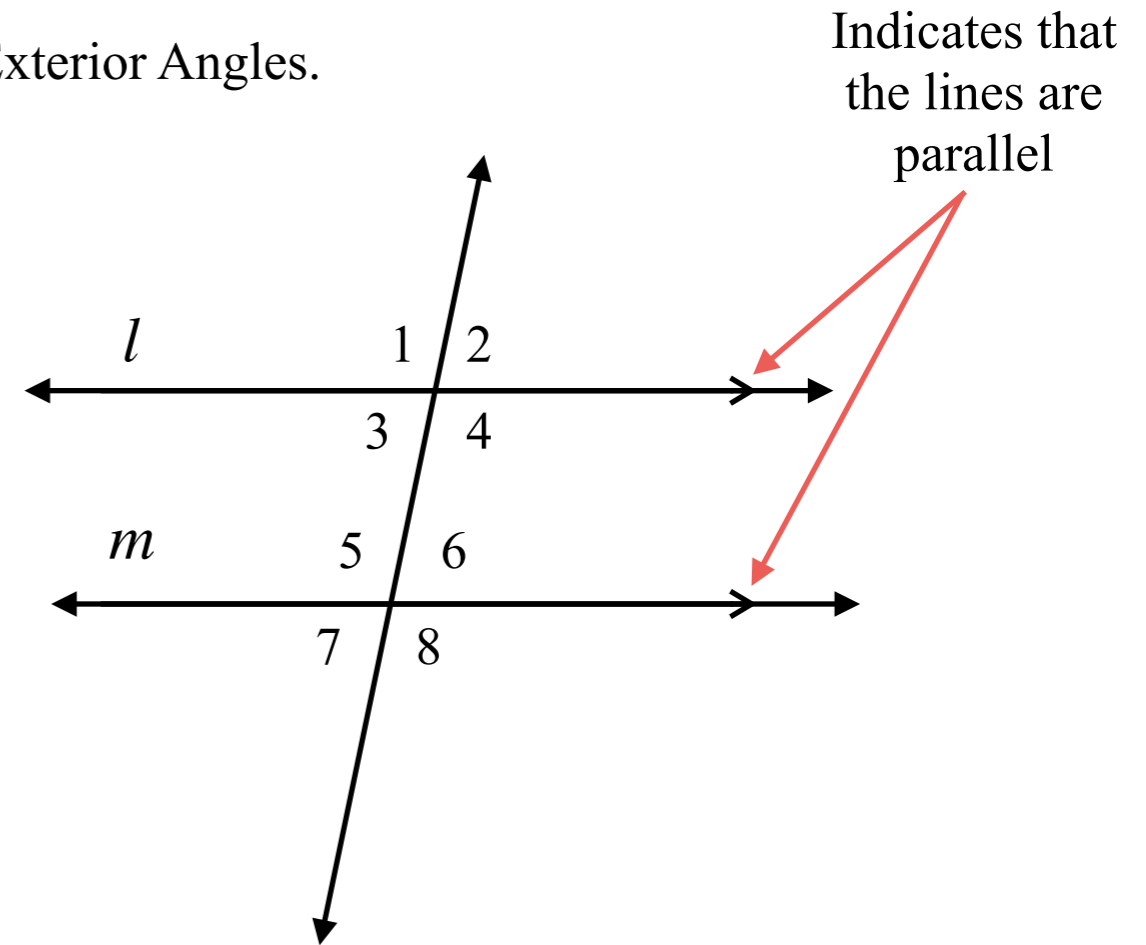
Same-Side Interior Angles – are supplementary $m\angle 3 + m\angle 5 = 180^\circ$, and $m\angle 4 + m\angle 6 = 180^\circ$
(aka Consecutive Interior Angles)

Sample Proof: Suppose that we weren't sure about Alternate Exterior Angles.

Given $l \parallel m$

Prove that $\angle 1 \cong \angle 8$

$\angle 1 \cong \angle 4$	Vertical Angles Theorem
$\angle 4 \cong \angle 8$	Corresponding Angles are Congruent (if the lines are parallel)
$\angle 1 \cong \angle 8$	Transitive Property of Congruence



Alternate Exterior Angles Theorem (Pg 156)

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