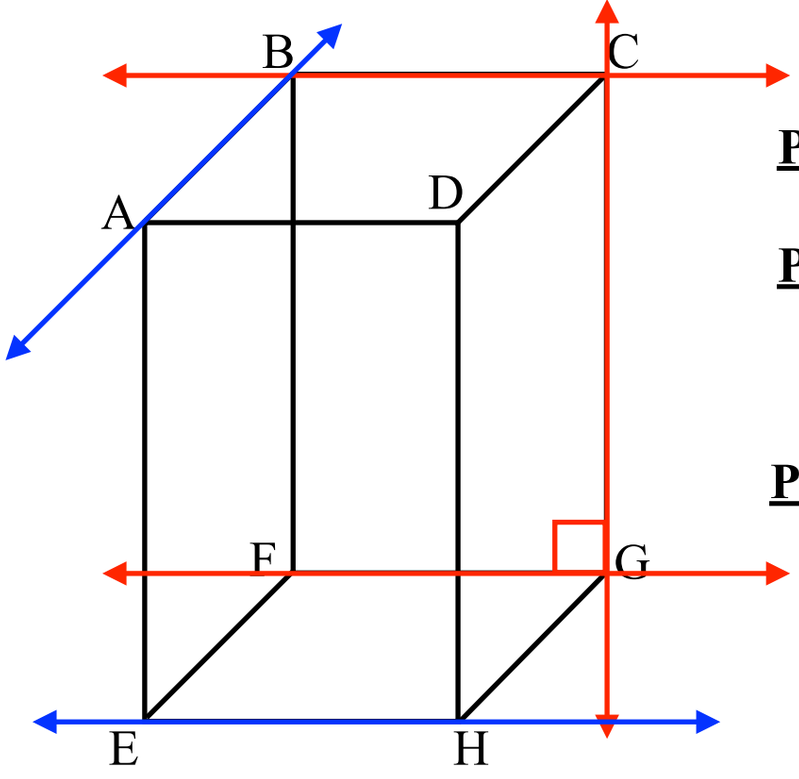
Angles & Lines

Parallels & Transversals



Parallel Planes – are planes that never intersect such as planes ABC and EFG

Parallel Lines – are coplanar and do not intersect such as $\overleftrightarrow{BC}$ and $\overleftrightarrow{FG}$

$\overleftrightarrow{BC} \parallel \overleftrightarrow{FG}$

Perpendicular Lines – intersect at 90 degree angles such as $\overleftrightarrow{EH}$ and $\overleftrightarrow{DH}$

$\overleftrightarrow{EH} \perp \overleftrightarrow{DH}$

Skew Lines – are not coplanar and do not intersect such as $\overleftrightarrow{EH}$ and $\overleftrightarrow{AB}$

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

$\angle 1 \cong \angle 4$

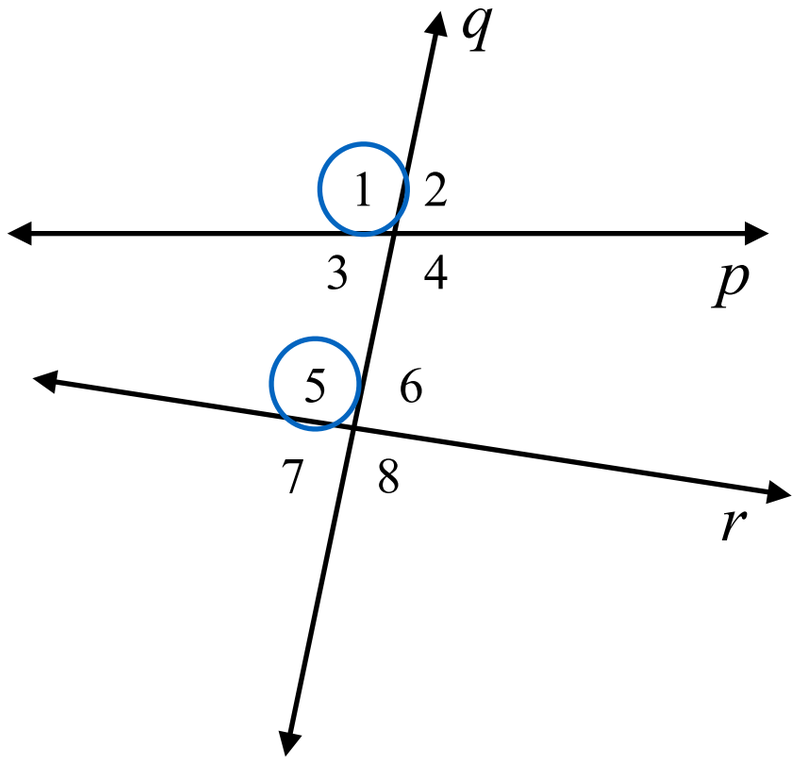
$\angle 2 \cong \angle 3$

$\angle 5 \cong \angle 8$

$\angle 6 \cong \angle 7$

And how do we know this?

Vertical Angles Theorem



Transversal – A line that intersects two or more coplanar lines at two different points (line q). 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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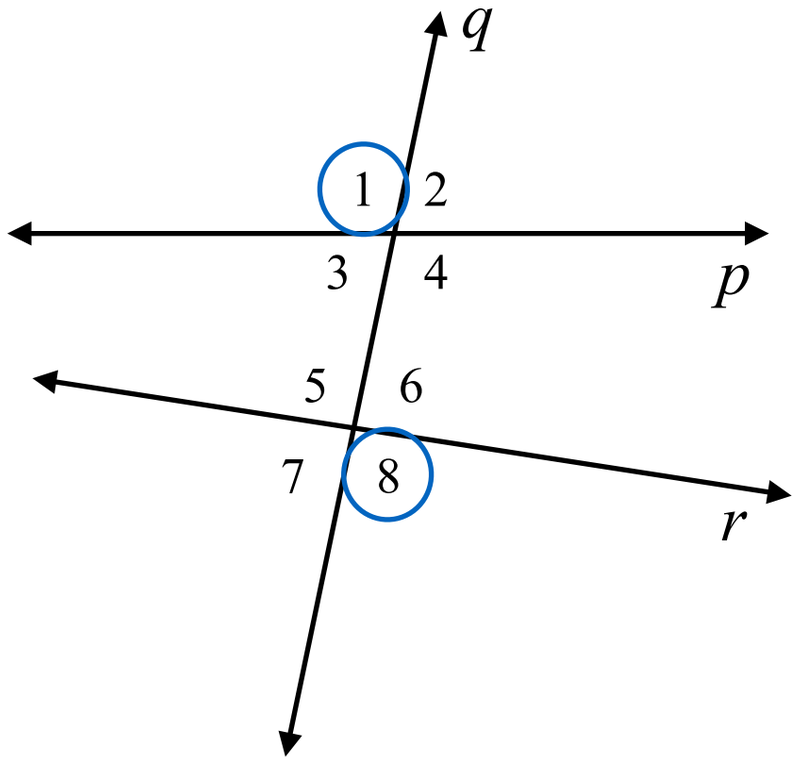

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<u>Corresponding Angles</u> – lie on the same side of the transversal, and on the same side of the lines. They occupy corresponding positions.

<u>Alternate Exterior Angles</u> – lie on opposite sides of the transversal, outside the two lines

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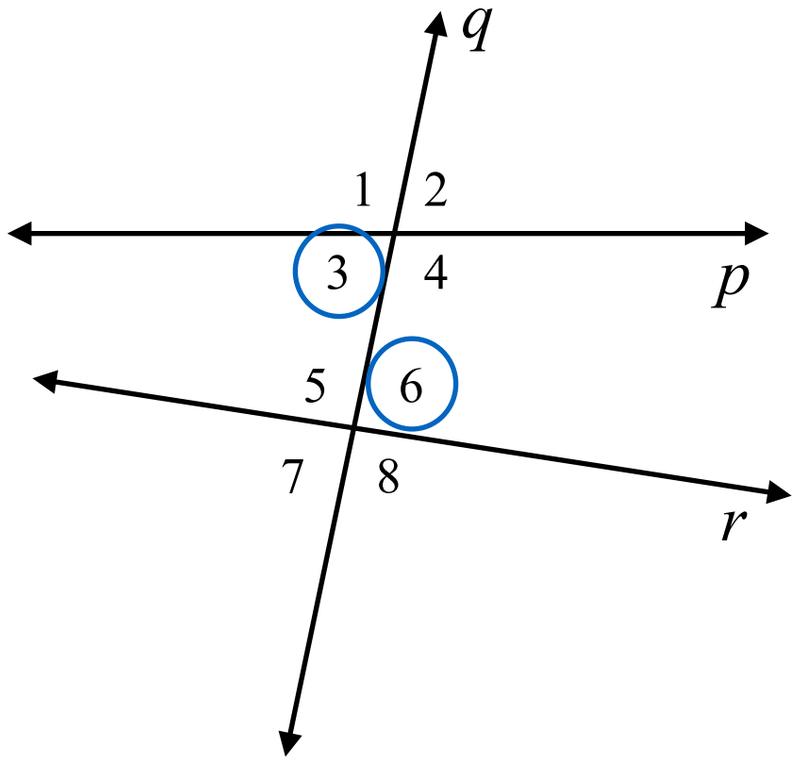

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<u>Alternate Interior Angles</u> – lie on the opposite sides of the transversal, between the two lines

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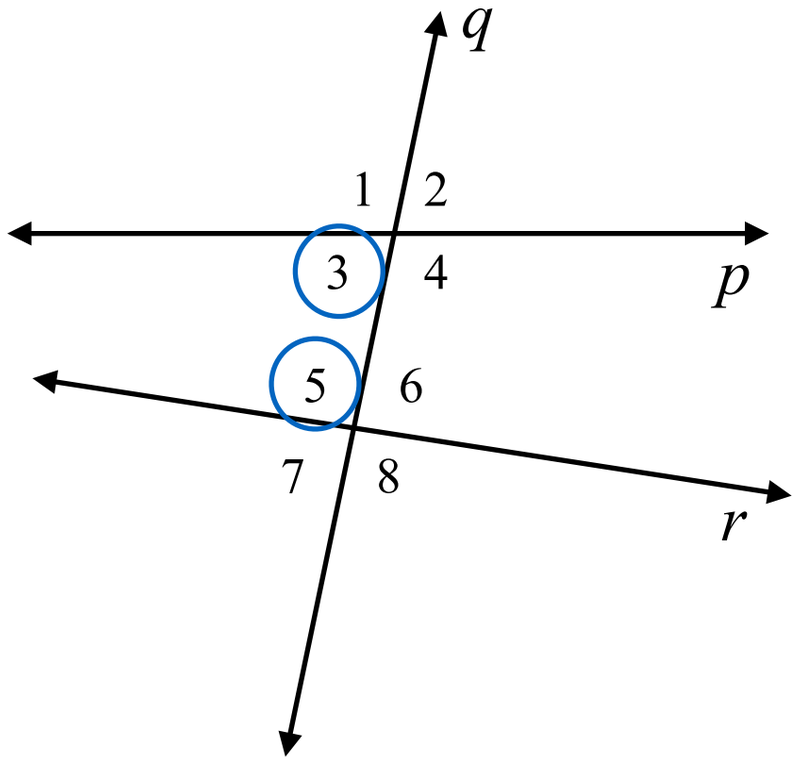

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Alternate Exterior Angles – lie on opposite sides of the transversal, outside the two lines

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)

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

$\angle 1 \cong \angle 4$

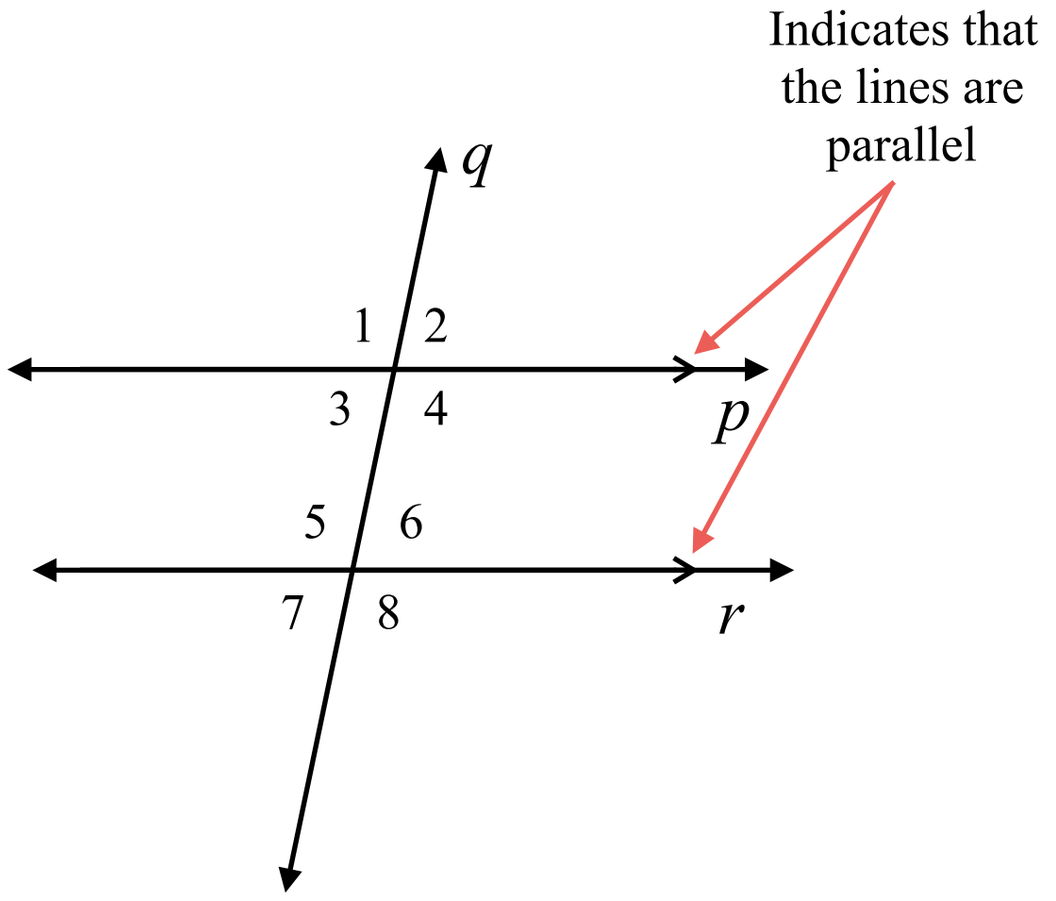
$\angle 2 \cong \angle 3$

$\angle 5 \cong \angle 8$

$\angle 6 \cong \angle 7$

And how do we know this?

Vertical Angles Definition



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

Remember that these below 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 $\angle 3 \cong \angle 6,\ and\ \angle 4 \cong \angle 5$

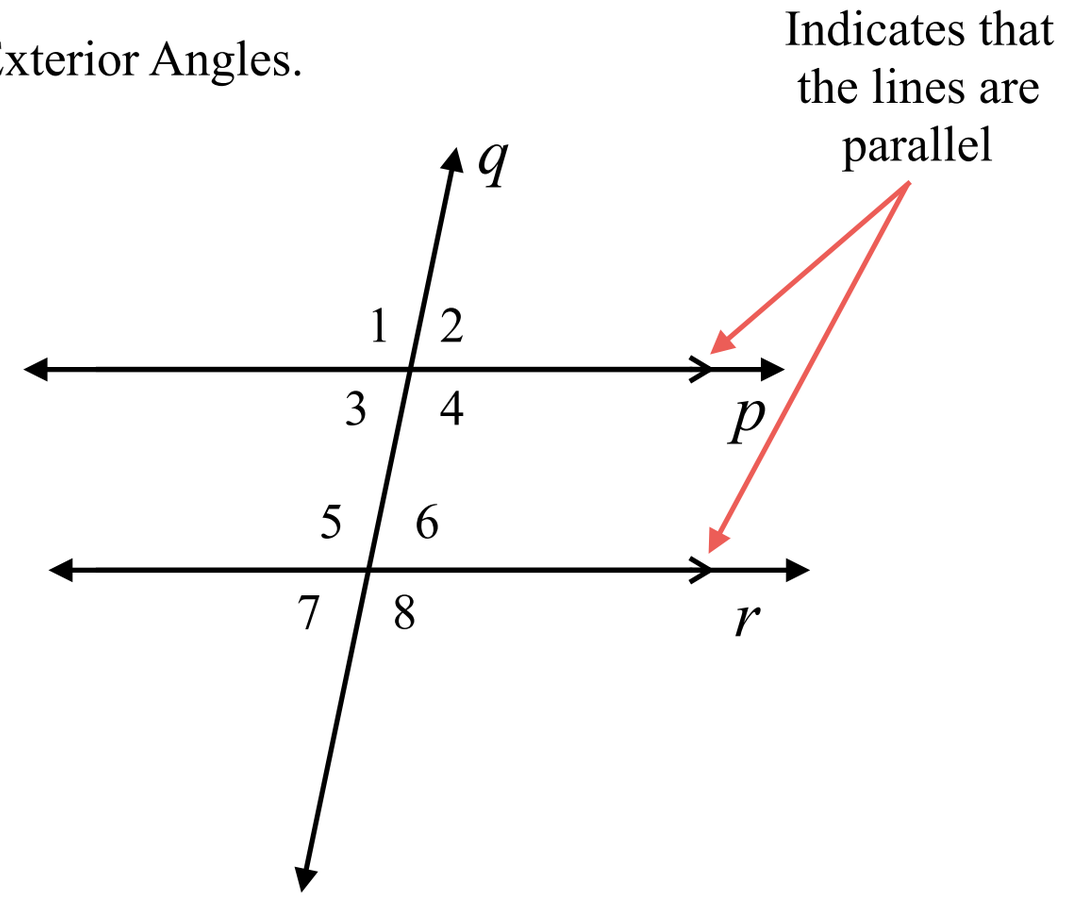
Same-Side Interior Angles – are supplementary $m\angle 3 + m\angle 5 = 180°,\ and\ m\angle 4 + m\angle 6 = 180°$
(aka Consecutive Interior Angles)

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

Given $p \parallel r$

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



<u>Alternate Exterior Angles Theorem (Pg 156)</u>

When the two non-transversals are ***<u>parallel</u>***, they generate identical sets of angle pairs so that…

Remember that these below are true ***<u>only</u>*** when the two non-transversals are ***<u>parallel</u>***

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

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

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

<u>Same-Side Interior Angles</u> – are supplementary $m\angle 3 + m\angle 5 = 180°,\ and\ m\angle 4 + m\angle 6 = 180°$
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