Angle Relationships { 8.1 }

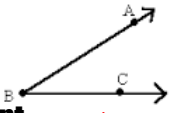
Secondary Math II Notes

OBJECTIVE: Determine congruent angles using angle relationships. Find angle measures using angle relationships.

Angle: the space (usually measured in degrees) between two intersecting lines. The intersecting point is called a vertex.

$\angle ABC$

Notation

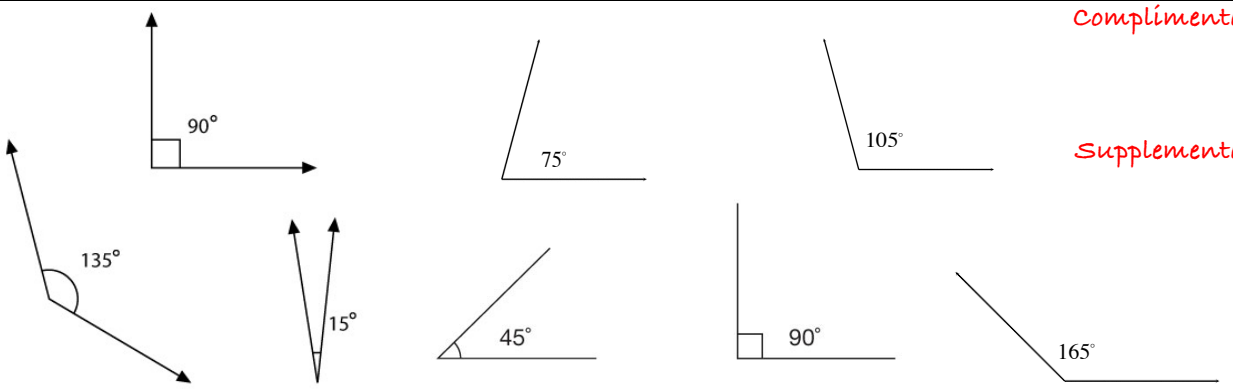


Congruent: Angles are congruent when they are the same size (in degrees or radians). Sides are congruent when they are the same length.

Complementary Angles: Two Angles are Complementary when their measures add up to 90 degrees

Supplementary Angles: Two Angles are Supplementary when their measures add up to 180 degrees

Determine and list the angles below that are complementary and the angles that are supplementary.



Complimentary Angles:

$15^\circ + 75^\circ$

Supplementary Angles:

$90^\circ + 90^\circ$

$135^\circ + 45^\circ$

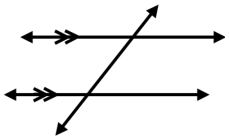
$105^\circ + 75^\circ$

$165^\circ + 15^\circ$

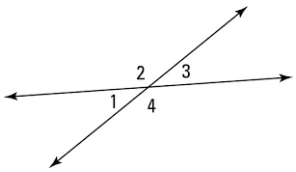
Parallel Lines: Two lines on a plane that never meet. They are always the same distance apart.

Notation: a || b

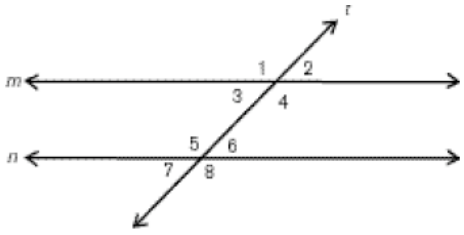
Transversal: a line that passes through two lines in the same plane at two distinct points



Vertical Angles: pairs of opposite angles made by two intersecting lines.



List all of the vertical angles



$\angle 1$ & $\angle 4$

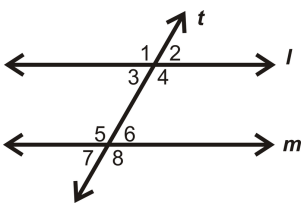
$\angle 2$ & $\angle 3$

$\angle 5$ & $\angle 8$

$\angle 6$ & $\angle 7$

Corresponding Angles: angles that occupy the same position at an intersection of a transversal and two parallel lines

List all of the corresponding angles



$\angle 1$ & $\angle 5$

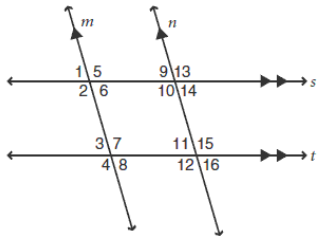
$\angle 2$ & $\angle 6$

$\angle 3$ & $\angle 7$

$\angle 4$ & $\angle 8$

Alternate Interior Angles: The pairs of **angles** on opposite sides of the transversal but inside the two parallel lines

List all of the Alternate Interior Angles

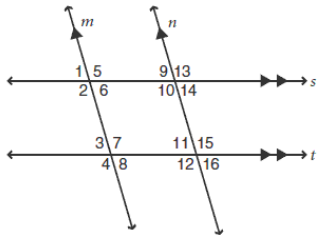


∠2 & ∠7
∠6 & ∠3
∠10 & ∠15
∠14 & ∠11

Alternate Exterior Angles:

The pairs of **angles** on opposite sides of the transversal but outside the two parallel lines

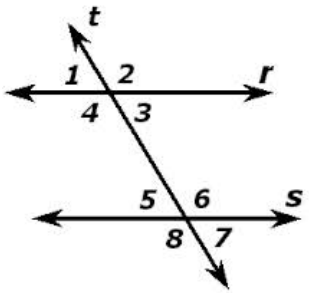
List all of the Alternate Exterior Angles



∠1 & ∠8
∠5 & ∠4
∠9 & ∠16
∠13 & ∠12

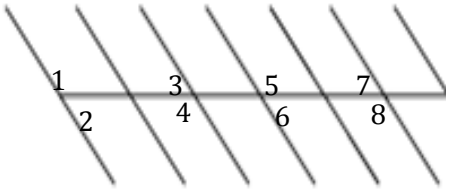
Using angle relationships to find angle measures

Assume r||s. True or False: $\angle 1 \cong \angle 7$.
Explain your answer.

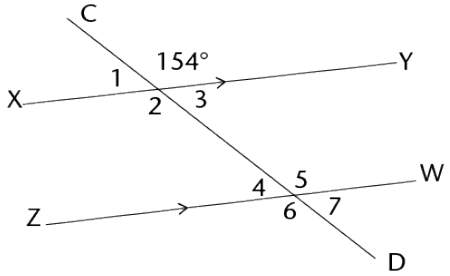


True. Since r||s $\angle 1 \cong \angle 7$ because they are alternate exterior angles

Explain how $\angle 1 \cong \angle 8$. **Answers will vary**
$\angle 1$ is a corresponding angle to $\angle 5$ and to the angle supplement of $\angle 7$. That angle is a vertical angle with $\angle 8$ so they must be equal

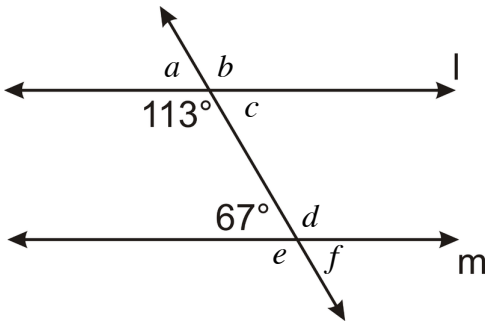


Assume $\overleftrightarrow{XY} \parallel \overleftrightarrow{ZW}$. Find the values of all missing angle measures.



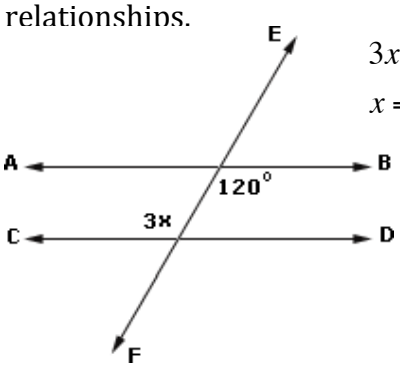
$m\angle 2 = 154$
$m\angle 5 = 154$
$m\angle 6 = 154$
$m\angle 1 = 26$
$m\angle 3 = 26$
$m\angle 4 = 26$
$m\angle 7 = 26$

Assume $l \parallel m$. Find the values of all missing angle measures.



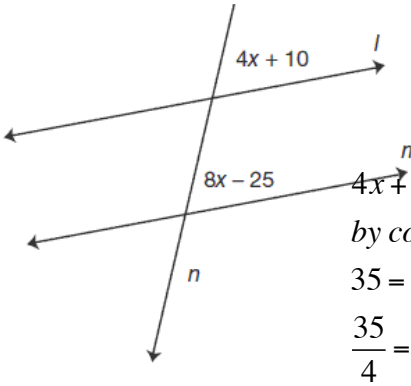
$m\angle b = 113$
$m\angle e = 113$
$m\angle d = 113$
$m\angle a = 67$
$m\angle c = 67$
$m\angle f = 67$

Assume $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$. Find the value of x using angle relationships.



$3x = 120$ (*by alt. interior*)
$x = 40$

Assume $l \parallel m$. Find the value of x using angle relationships.



$4x + 10 = 8x - 25$
by corresponding angles
$35 = 4x$
$\frac{35}{4} = x$