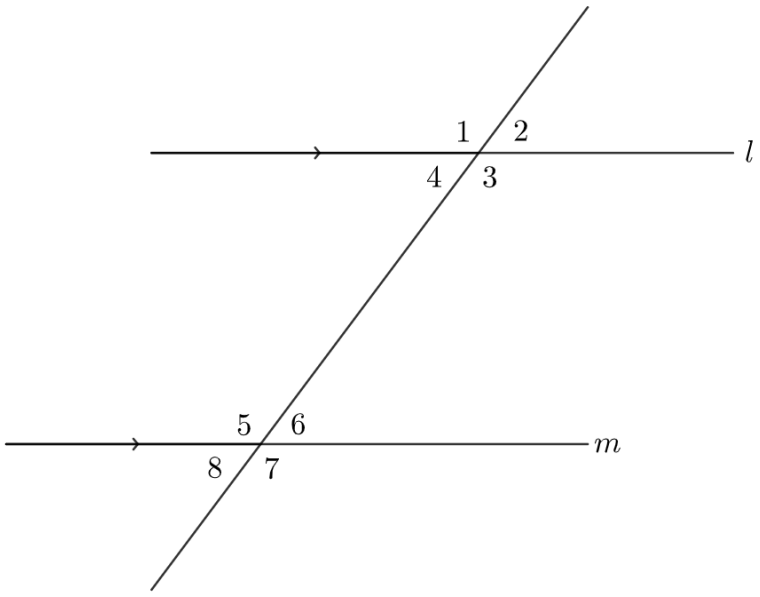
Name: _____

Lesson 1.14
Transversals

Geometry GT

Recall

In the figure below, $l \parallel m$.



Identify the relationship between each of the following angle pairs.

A. $\angle 1$ and $\angle 3$

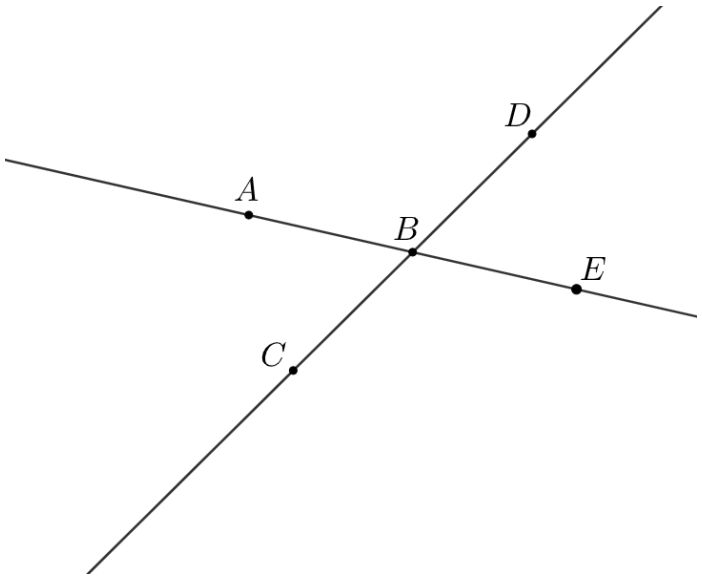
B. $\angle 5$ and $\angle 6$

C. $\angle 4$ and $\angle 8$

D. $\angle 3$ and $\angle 5$

Explore

Lines $\overleftrightarrow{AE}$ and $\overleftrightarrow{CD}$ are intersecting.



Translate lines $\overleftrightarrow{AE}$ and $\overleftrightarrow{CD}$ by the directed line segment from B to C. Label the images of A, B, C, D, and E as A', B', C', D', and E'. What is true about lines $\overleftrightarrow{AE}$ and $\overleftrightarrow{A'E'}$?

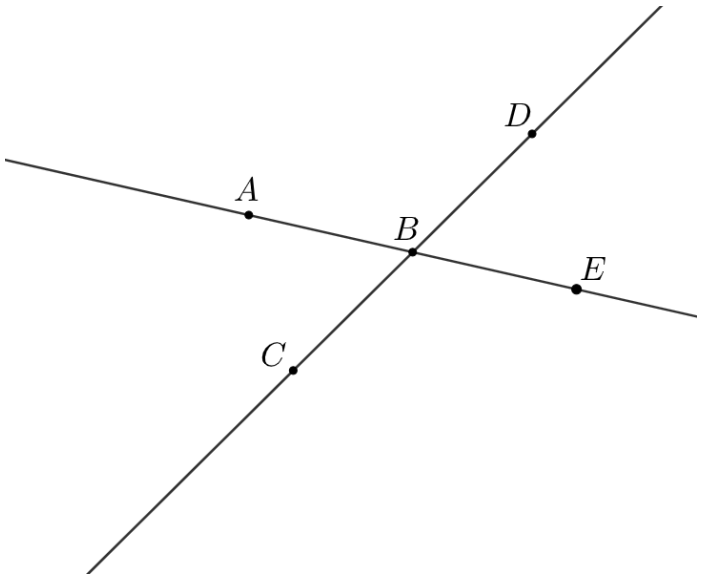
Identify any pairs of congruent angles. Explain your reasoning.

Assertion

Rotations by 180° take lines to parallel lines or themselves.

Discuss

Lines $\overleftrightarrow{AE}$ and $\overleftrightarrow{CD}$ are intersecting.



Rotate line $\overleftrightarrow{AE}$ by 180° around point C. Label the images of A, B, C, D, and E as A', B', C', D', and E'. What is true about lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{A'B'}$?

Identify any pairs of congruent angles. Explain your reasoning.

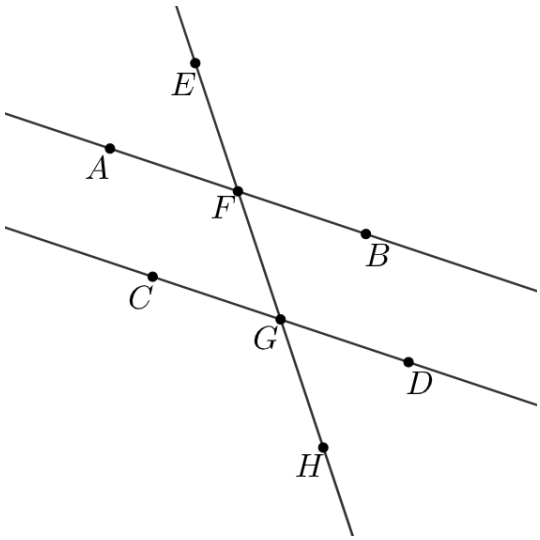
Theorems

Corresponding Angle Theorem: if two parallel lines are cut by a transversal, then corresponding angles are congruent; conversely, if two lines are cut by a transversal and corresponding angles are congruent, then the lines must be parallel

Alternate Interior Angle Theorem: if two parallel lines are cut by a transversal, then alternate interior angles are congruent; conversely, if two lines are cut by a transversal and alternate interior angles are congruent, then the lines must be parallel

Demonstrate

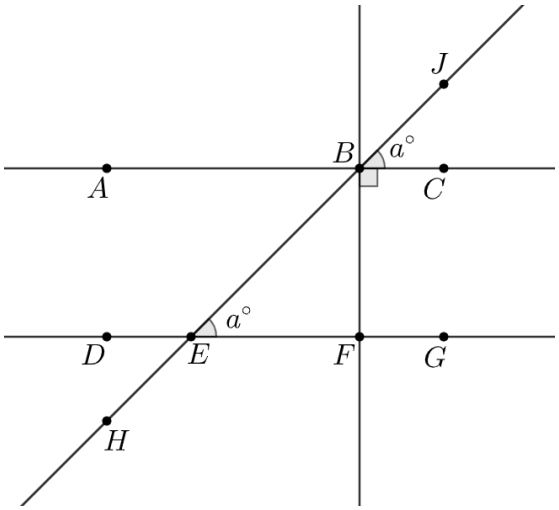
In the figure below, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, $m\angle AFE = 14x - 31$, $m\angle CGF = 8x + 5$, and $m\angle CGH = 9y - 35$.



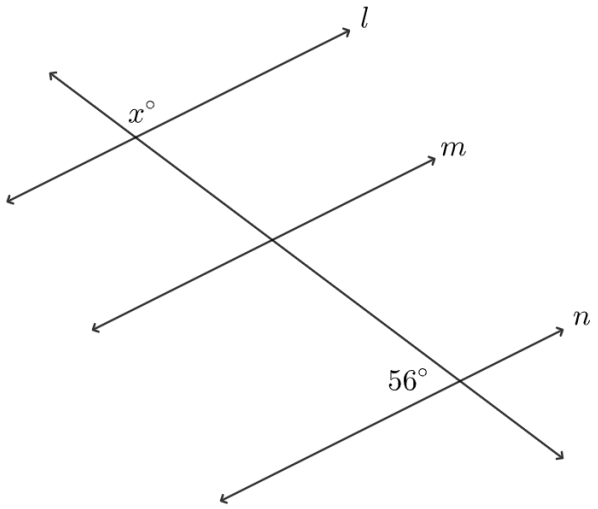
Find the values of x and y.

Practice

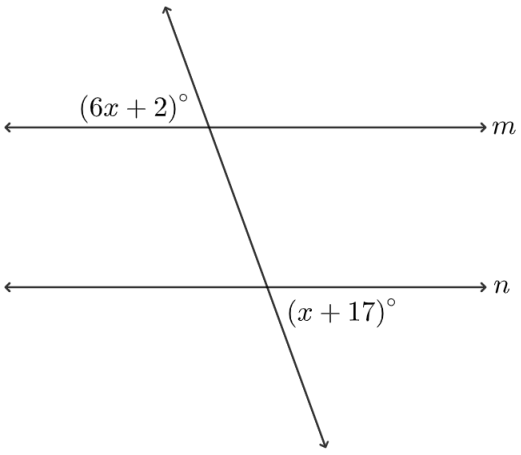
1. Explain why $\overleftrightarrow{AC}$ and $\overleftrightarrow{DG}$ must be parallel.



2. Lines l, m, and n are parallel. Find the value of x.



3. Given that $m \parallel n$, find the value of x.



4. Lines $\overleftrightarrow{AC}$ and $\overleftrightarrow{BC}$ are perpendicular. The dashed rays bisect angles $\angle BCD$ and $\angle ACD$. Explain why $m\angle ECF = 45°$.