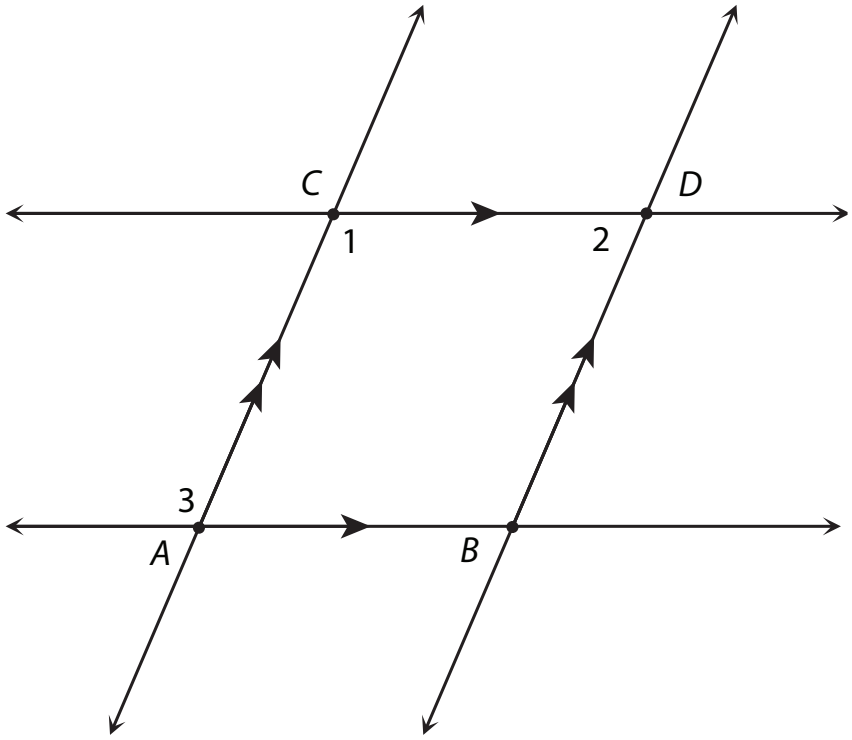
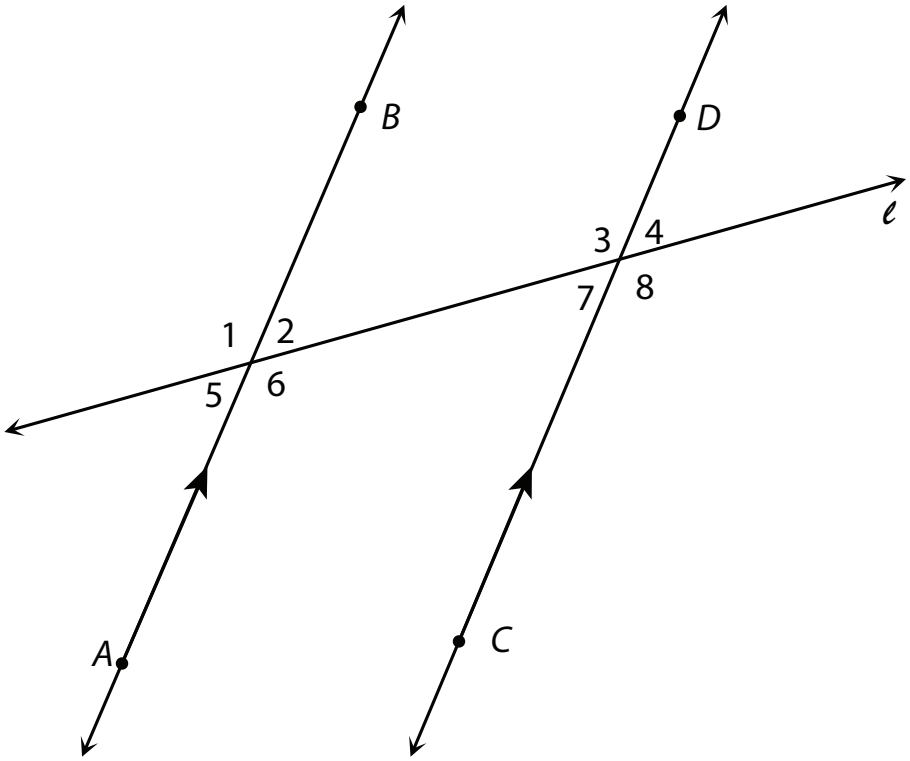
Example 3

In the following diagram, $\overleftrightarrow{AB} \| \overleftrightarrow{CD}$ and $\overleftrightarrow{AC} \| \overleftrightarrow{BD}$. If $m\angle 1 = 3(x+15)$, $m\angle 2 = 2x+55$, and $m\angle 3 = 4y+9$, find the measures of the unknown angles and the values of x and y.



Practice 1.8.2: Proving Theorems About Angles in Parallel Lines Cut by a Transversal

Use the following diagram to solve problems 1–5, given that $\overleftrightarrow{AB} \| \overleftrightarrow{CD}$ and line ℓ is the transversal. Justify your answers using angle relationships in parallel lines intersected by a transversal.



1. Find $m\angle 5$ if $m\angle 5 = 2(3x+13)$ and $m\angle 7 = 3x+50$.

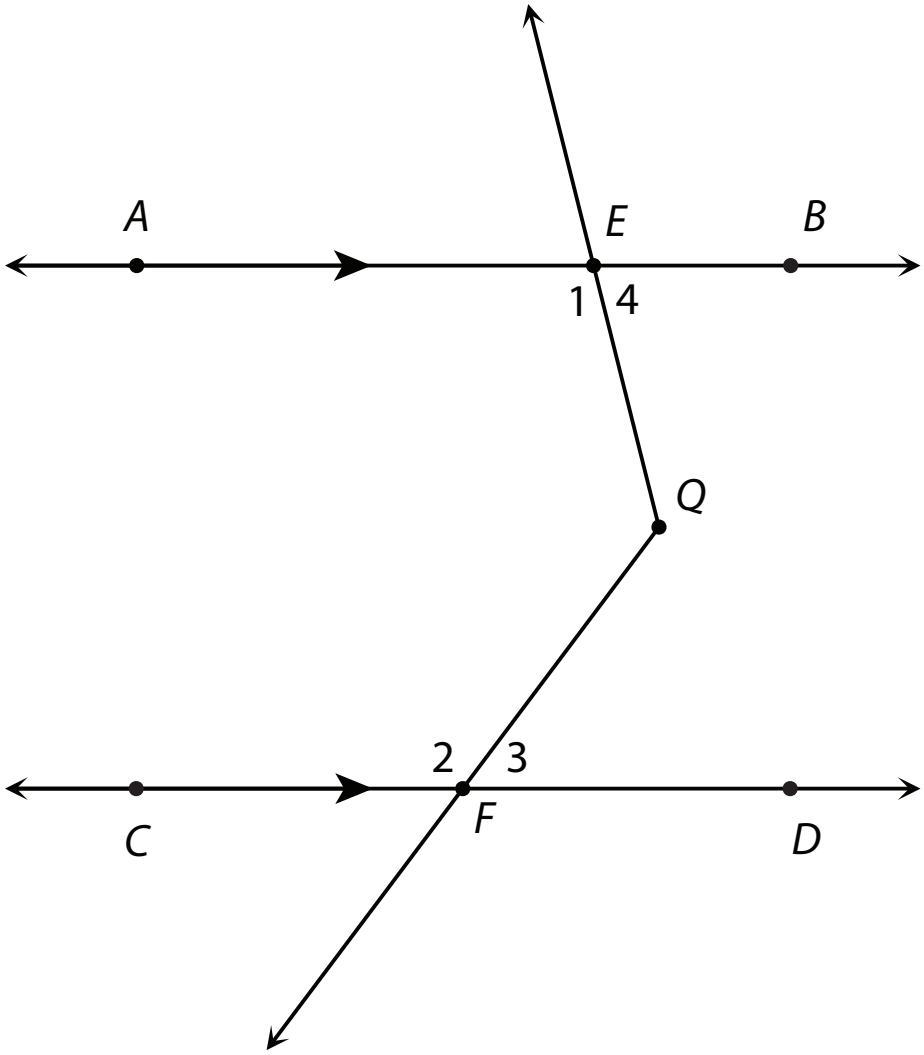
2. Find $m\angle 2$ if $m\angle 2 = 4x+39$ and $m\angle 7 = 12x-17$.

3. Find $m\angle 6$ if $m\angle 6 = 7x+41$ and $m\angle 7 = 3x-1$.

4. Find $m\angle 4$ if $m\angle 4 = 2(5x-9)$ and $m\angle 5 = 3(x+8)$.

5. Find $m\angle 1$ if $m\angle 1 = 11x+35$ and $m\angle 4 = x+1$.

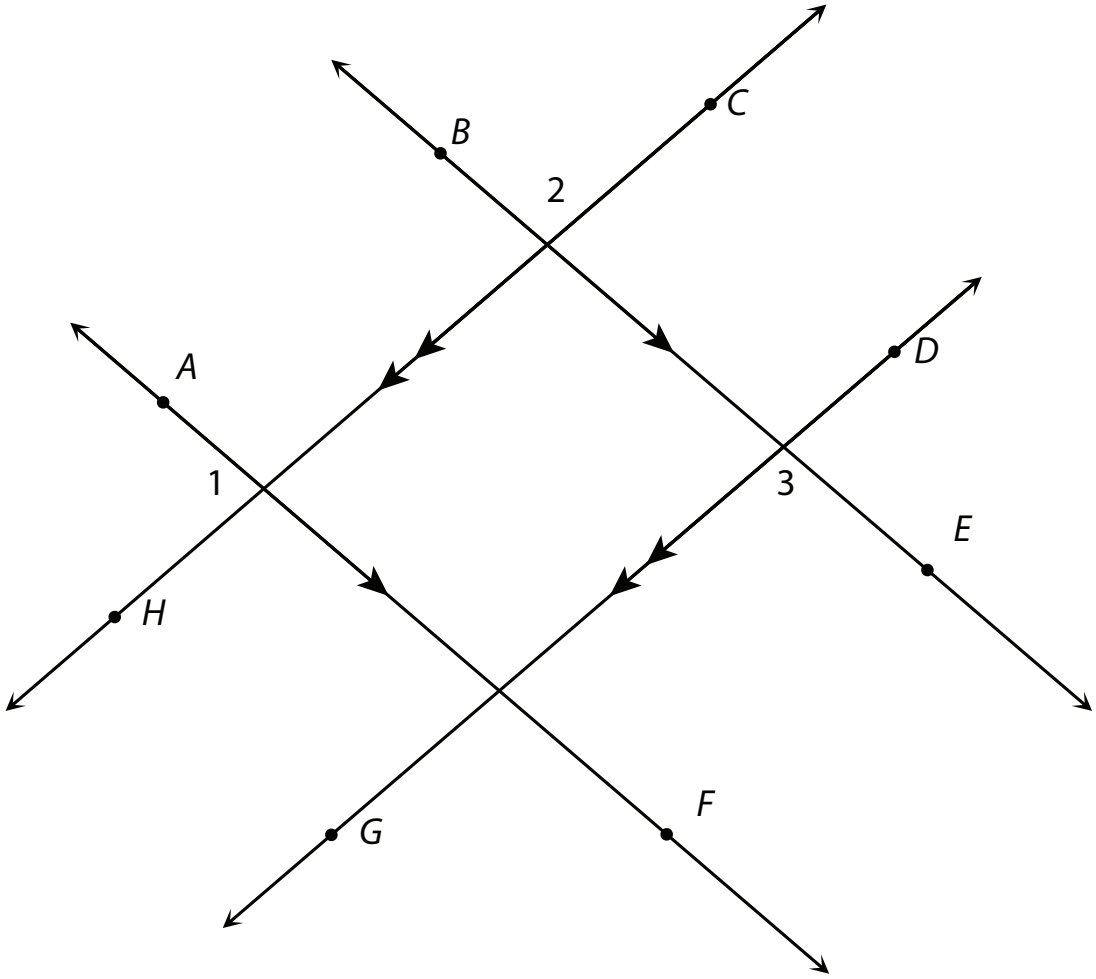
Use the following diagram to solve problems 6 and 7. Given: $\overleftrightarrow{AB} \| \overleftrightarrow{CD}$.



6. Find $m\angle EQF$ if $m\angle 1 = 110$ and $m\angle 2 = 135$.

7. Find $m\angle EQF$ if $m\angle 1 = 117$ and $m\angle 3 = 31$.

Use the following diagram to solve problem 8. Given: $\overleftrightarrow{AF} \| \overleftrightarrow{BE}$, $\overleftrightarrow{HC} \| \overleftrightarrow{GD}$, $m\angle 1 = 5x - 16$, $m\angle 2 = 6x - 13$, and $m\angle 3 = 10y - 9$.



8. Find the measures of the numbered angles and the values of x and y. Justify your reasoning.