

## Just in Time Quick Check

### Standard of Learning G.RLT.2

#### **Strand:** Reasoning, Lines, and Transformations

#### **Standard of Learning G.RLT.2**

**The student will analyze, prove, and justify the relationships of parallel lines cut by a transversal.**

*Students will demonstrate the following Knowledge and Skills:*

- a) Prove and justify angle pair relationships formed by two parallel lines and a transversal, including:
  - i) corresponding angles;
  - ii) alternate interior angles;
  - iii) alternate exterior angles;
  - iv) same-side (consecutive) interior angles; and
  - v) same-side (consecutive) exterior angles.
- b) Prove two or more lines are parallel given angle measurements expressed numerically or algebraically.
- c) Solve problems by using the relationships between pairs of angles formed by the intersection of two parallel lines and a transversal.

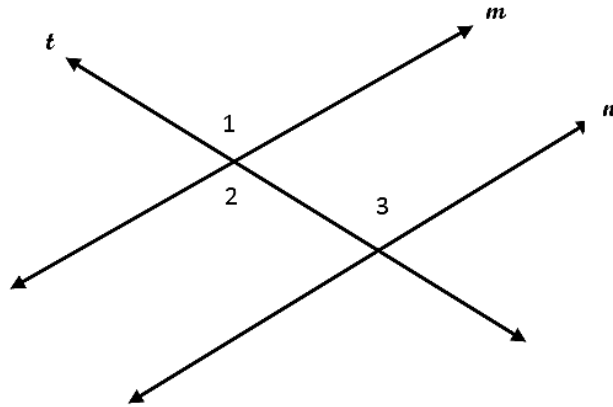
#### Just in Time Quick Check

#### Just in Time Quick Check Teacher Notes

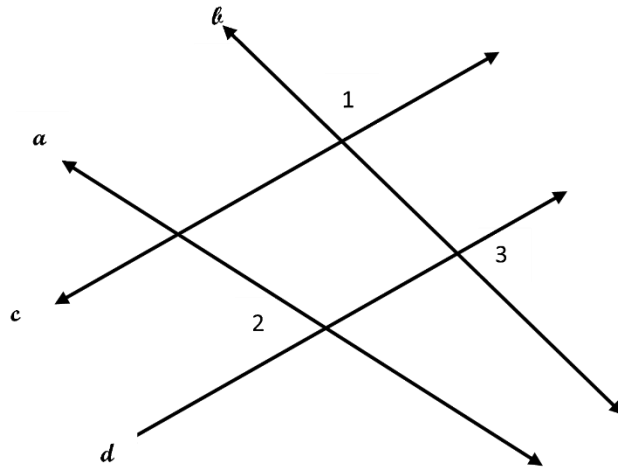
**Supporting and Prerequisite SOL:** 8.MG.1

### Just in Time Quick Check G.RL.2

1. Using the given diagram, determine two different angle relationships that would prove line  $m \parallel n$ . State the postulate or theorem that justifies each answer.

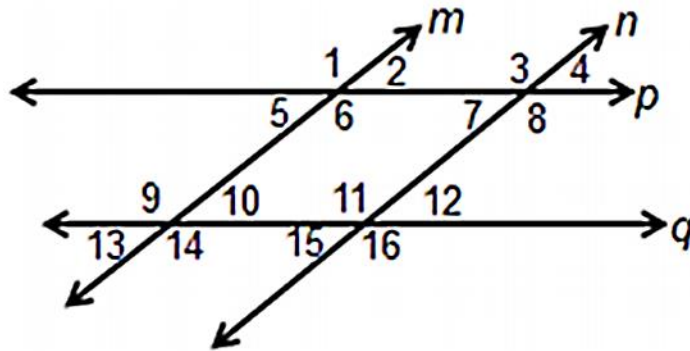


2. Given:  
 $m\angle 1 = (7x + 13)^\circ$   
 $m\angle 2 = (3x - 25)^\circ$   
 $m\angle 3 = (2x + 5)^\circ$



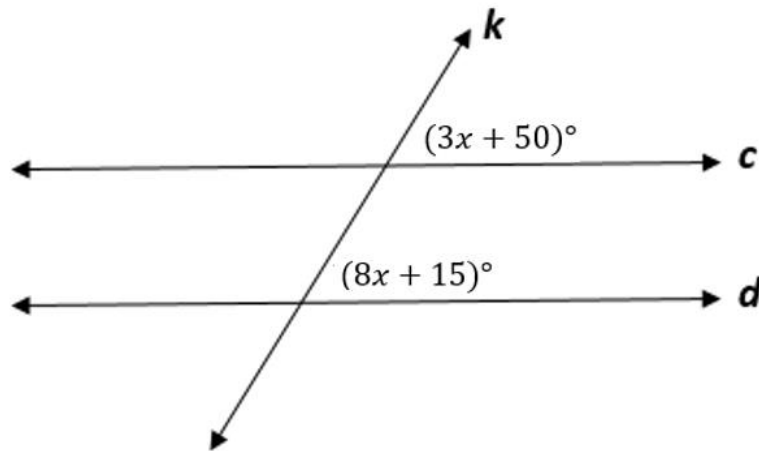
What value of  $x$  could be used to prove  $c \parallel d$ ?

3. Circle each statement that can be used to prove  $m \parallel n$  and  $p \parallel q$ . There may be more than one answer. Justify your reasoning.

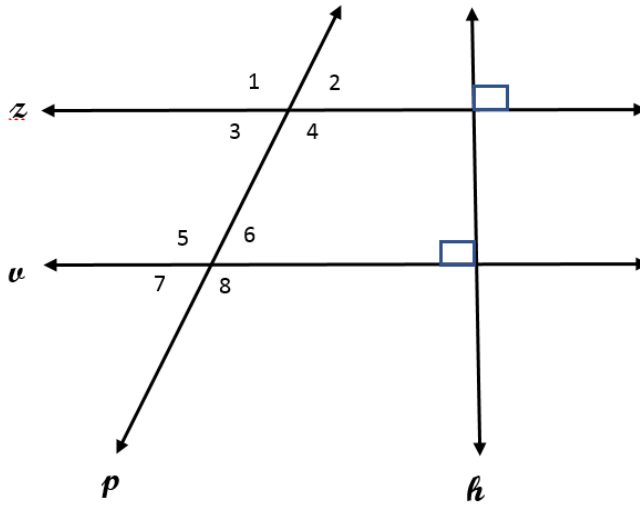


$\angle 2 \cong \angle 5$ and $\angle 13 \cong \angle 15$	$m\angle 9 + m\angle 12 = 180^\circ$ and $\angle 1 \cong \angle 3$
$m\angle 1 + m\angle 4 = 180^\circ$ and $\angle 8 \cong \angle 16$	$\angle 9 \cong \angle 16$ and $m\angle 11 + m\angle 7 = 180^\circ$
$m\angle 6 + m\angle 7 = 180^\circ$ and $\angle 3 \cong \angle 11$	$m\angle 14 + m\angle 15 = 180^\circ$ and $\angle 1 \cong \angle 16$

4. Given  $c \parallel d$ , solve for  $x$ .

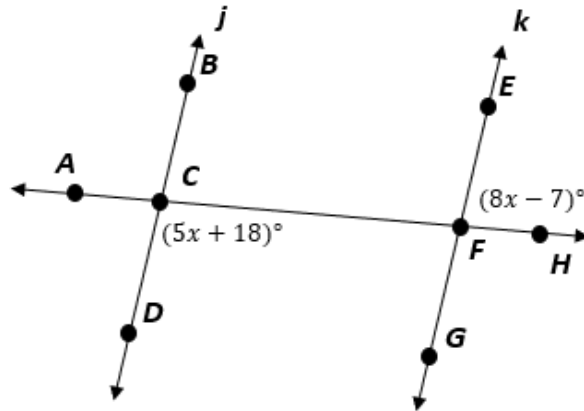


5. Complete the two-column proof using the diagram below. Explain your reasoning using valid statements, reasons, and mathematical notation.

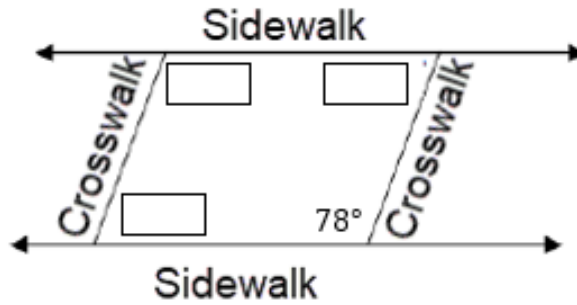


	Statement	Reason
Given: $z \perp h, h \perp v,$ $m\angle 2 = 72^\circ$	1. $z \perp h, h \perp v, m\angle 2 = 72^\circ$	1. Given
	2. $z \parallel v$	2.
Prove: $m\angle 6 = 72^\circ$	3.	3.
	4. $m\angle 6 = 72^\circ$	4.

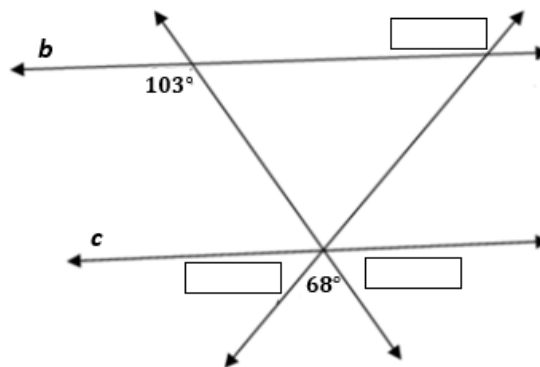
6. Line  $j$  is parallel to line  $k$ . Find the  $m\angle GFH$ .



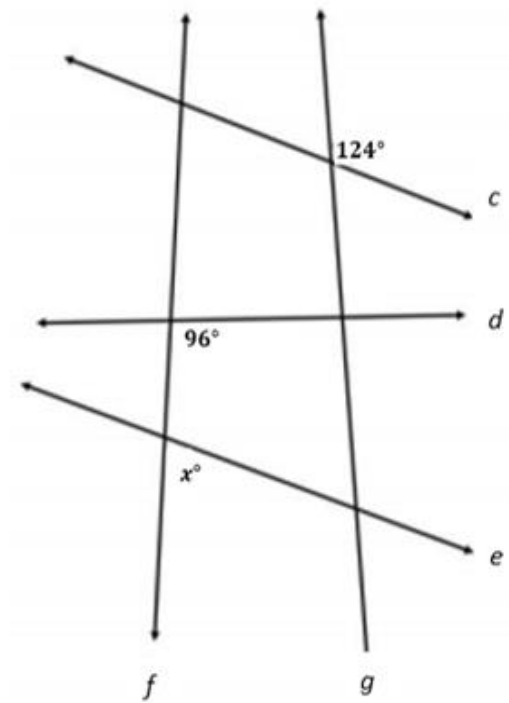
7. A new crosswalk is being built between the parallel sidewalks of Circle Avenue. The edges of the crosswalk are parallel. One angle that the crosswalk makes with the sidewalk measures 78 degrees, as shown. Fill in the boxes to determine the measures of the missing angles.



8. Given  $b \parallel c$ , fill in the boxes with the measures of the missing angles.



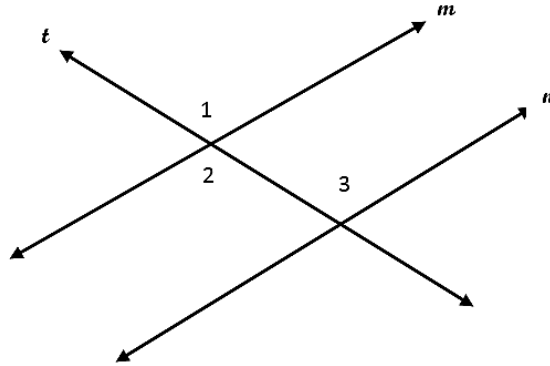
9. Given  $c \parallel e$  and  $f \parallel g$ , describe how you would find the value of  $x$ .



## G.RLT.2 Just in Time Quick Check Teacher Notes

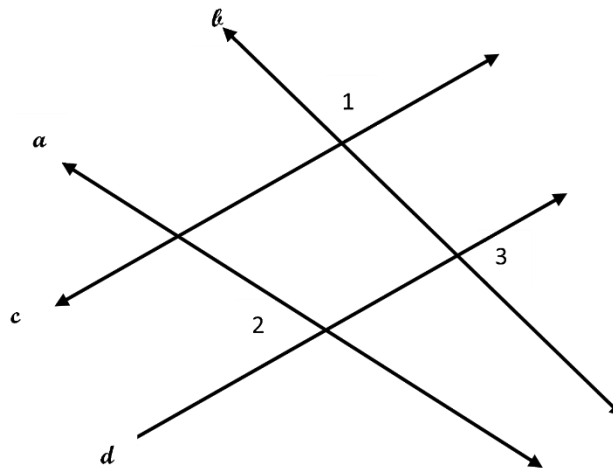
### Common Errors/Misconceptions and their Possible Indications

- Using the given diagram, determine two different angle relationships that would prove line  $m \parallel n$ . State the postulate or theorem that justifies each answer.



*A common error that some students may make is not stating both angle relationships. Some students can identify that angle 2 and angle 3 are alternate interior angles and other students can identify that angle 1 and angle 3 are corresponding angles. Still other students recognize that angle 1 is congruent to angle 2, but they do not realize that this relationship does not prove lines are parallel. Teachers are encouraged to provide additional opportunities for identifying angle relationships and determining which relationships can be used to prove lines are parallel. It may be helpful to create anchor charts or vocabulary cards to help students make angle connections.*

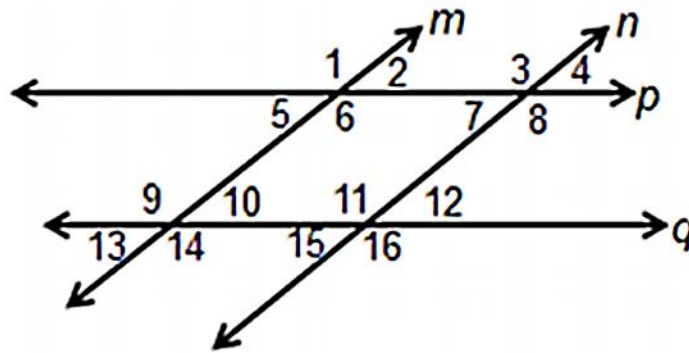
- Given:  
 $m\angle 1 = (7x + 13)^\circ$   
 $m\angle 2 = (3x - 25)^\circ$   
 $m\angle 3 = (2x + 5)^\circ$



What value of  $x$  could be used to prove  $c \parallel d$ ?

A common error that some students may make is using angle 2 and angle 3 to find the value of  $x$ . Students are asked to prove that lines  $c$  and  $d$  are parallel. This misconception may indicate students are using the wrong transversal to identify parallel lines. Students making this error may benefit from highlighting or coloring lines  $c$  and  $d$  and the related angles. Teachers may wish to ask questions such as—What are the angles associated with transversal  $a$ ? Transversal  $b$ ? What type of angles are they? What is their relationship? Another strategy that may benefit some students is using dynamic software to discover properties of angles along a transversal. This allows students to observe congruent and supplementary angles connected to parallel lines. As students move the transversal, and the diagram shifts, the angle measures will update.

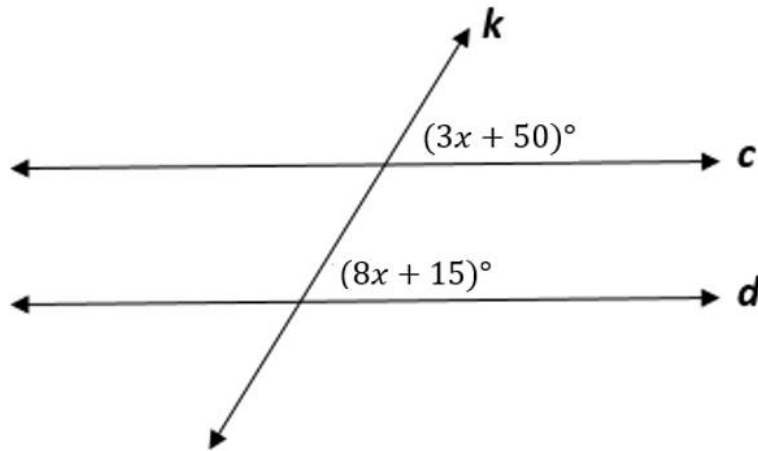
3. Circle each statement that can be used to prove  $m \parallel n$  and  $p \parallel q$ . There may be more than one answer. Justify your reasoning.



$\angle 2 \cong \angle 5$ and $\angle 13 \cong \angle 15$	$m\angle 9 + m\angle 12 = 180^\circ$ and $\angle 1 \cong \angle 3$
$m\angle 1 + m\angle 4 = 180^\circ$ and $\angle 8 \cong \angle 16$	$\angle 9 \cong \angle 16$ and $m\angle 11 + m\angle 7 = 180^\circ$
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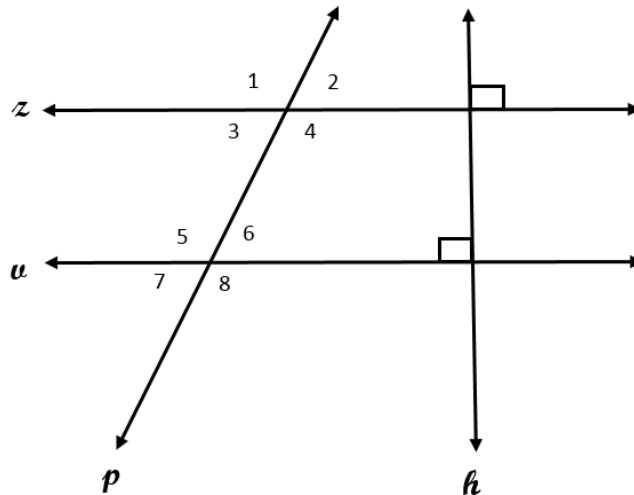
A common error some students may make is to incorrectly identify the supplementary pairs of angles as congruent and the congruent pairs of angles as supplementary. Other students make the error of trying to use the relationship between vertical angles to prove lines parallel. Still others may attempt to make relationships between angles that are not on the same transversal. These students may benefit from color-coding to show the relationships between angles on the same transversal. Another strategy that may benefit some students is to use graph paper and a straight edge to model lines that are NOT parallel and to model lines that are parallel. Students would then use a protractor to measure angles created by a transversal to determine those angles that are congruent and angles that are supplementary. During this activity, students would also benefit from a discussion of the angles that can be used to verify parallelism.

4. Given  $c \parallel d$ , solve for  $x$ .



*A common error some students may make is to set  $3x + 50 + 8x + 15 = 180$ . This may indicate that students have assumed that all angles that are on the same side are supplementary. A strategy that may help students determine if the angles are congruent or supplementary is to encourage students to identify the acute and obtuse angles. All acute angles formed by parallel lines cut by a transversal are congruent, as are all obtuse angles formed by these lines. Creating anchor charts or vocabulary cards may help remind students of the various angle relationships associated with parallel lines.*

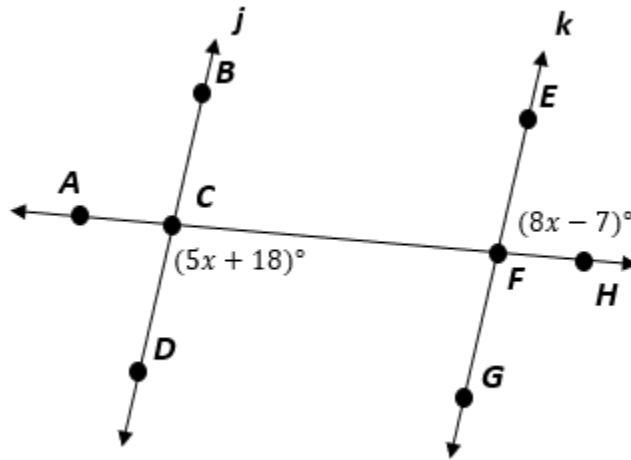
5. Complete the two-column proof using the diagram below. Explain your reasoning using valid statements, reasons, and mathematical notation.



	Statement	Reason
Given: $z \perp h, h \perp v,$ $m\angle 2 = 72^\circ$	1. $z \perp h, h \perp v, m\angle 2 = 72^\circ$	1. Given
	2. $z \parallel v$	2.
Prove: $m\angle 6 = 72^\circ$	3.	3.
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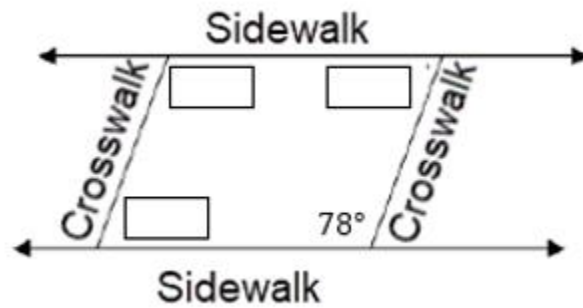
*Some students may be able to explain verbally why line  $z$  is parallel to line  $v$ , but they may not know the theorem well enough to state it as the reason for statement 2. Other students may have difficulty figuring out how to use statement 2 to help them make the connection to what they are trying to prove. All students will benefit from marking the figure with the given information and then identifying what they want to prove. Color-coding may also help some students determine angle relationships in the figure.*

6. Line  $j$  is parallel to line  $k$ . Find the  $m\angle GFH$ .



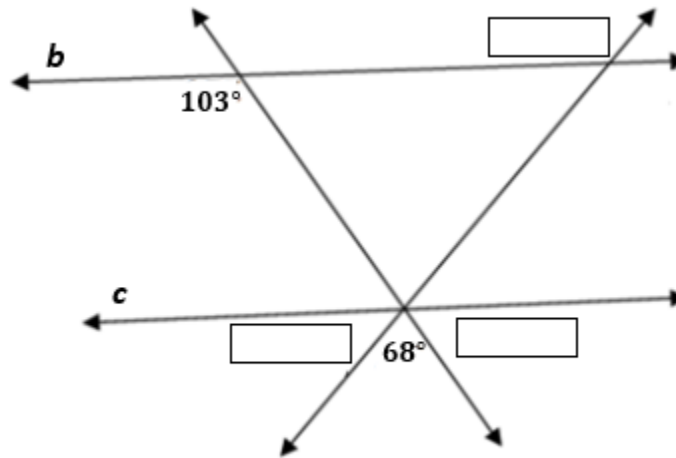
*A common error some students may make is to solve for  $x$  but not find the angle measure. Another error some students may make is to find the value of  $x$  and substitute it into the wrong expression. This may indicate that students do not recognize the congruent relationship between  $\angle DCF$  and  $\angle GFH$  or the linear pair relationship between  $\angle EFH$  and  $\angle GFH$ . Teachers can use patty paper to help students determine other angles that may be congruent to  $m\angle GFH$ .*

7. A new crosswalk is being built between the parallel sidewalks of Circle Avenue. The edges of the crosswalk are parallel. One angle that the crosswalk makes with the sidewalk measures 78 degrees, as shown. Fill in the boxes to determine the measures of the missing angles.



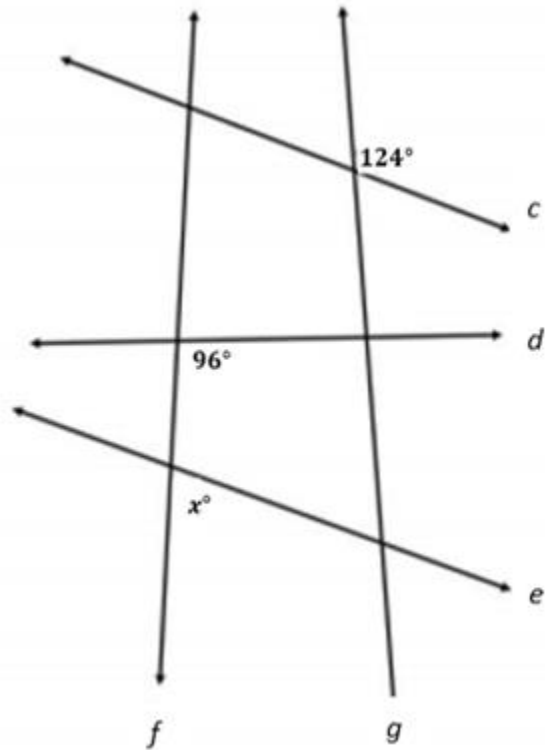
*A common misconception students may have is to think that there is not enough information available to solve the problem. This may indicate that students do not recognize the angle relationships in parallel lines since the crosswalk lines are not extended. It may be helpful to encourage students to extend lines in pictures to visualize more easily the parallel lines and the angle relationships.*

8. Given  $b \parallel c$ , fill in the boxes with the measures of the missing angles.



*A common error students may make is to assume that the other obtuse angle is  $103^\circ$  as well. This may indicate that students assume that both transversals create the same angle measurements. Teachers may encourage students to cover the transversal that is not being used so the problem appears simpler.*

9. Given  $c \parallel e$  and  $f \parallel g$ , describe how you would find the value of  $x$ .



*A common error students may make is to assume  $x$  is equal to  $96^\circ$  since  $x$  and  $96^\circ$  are corresponding angles. This may indicate that students think that congruent and supplementary angle relationships in parallel lines hold true for non-parallel lines. Teachers may encourage students to cover the non-parallel transversal.*