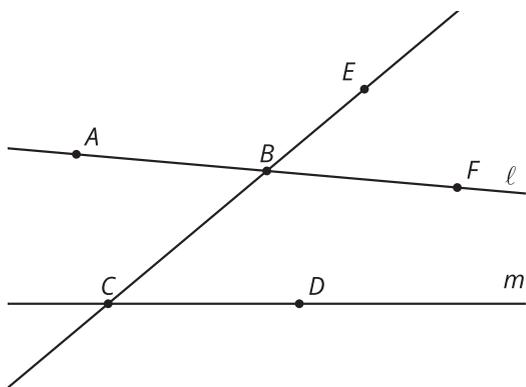


# Unit 1 Lesson 21: One Hundred and Eighty

## 1 What Went Wrong? (Warm up)

### Student Task Statement

Here are 2 lines  $\ell$  and  $m$  that are *not* parallel that have been cut by a transversal.



Tyler thinks angle  $EBF$  is congruent to angle  $BCD$  because they are corresponding angles and a translation along the directed line segment from  $B$  to  $C$  would take one angle onto the other. Here are his reasons.

- The translation takes  $B$  onto  $C$ , so the image of  $B$  is  $C$ .
- The translation takes  $E$  somewhere on ray  $CB$  because it would need to be translated by a distance greater than  $BC$  to land on the other side of  $C$ .
- The image of  $F$  has to land somewhere on line  $m$  because translations take lines to parallel lines and line  $m$  is the only line parallel to  $\ell$  that goes through  $B'$ .
- The image of  $F$ , call it  $F'$ , has to land on the right side of line  $BC$  or else line  $FF'$  wouldn't be parallel to the directed line segment from  $B$  to  $C$ .

1. Your teacher will assign you one of Tyler's statements to think about. Is the statement true? Explain your reasoning.
2. In what circumstances are corresponding angles congruent? Be prepared to share your reasoning.

## 2 Triangle Angle Sum One Way

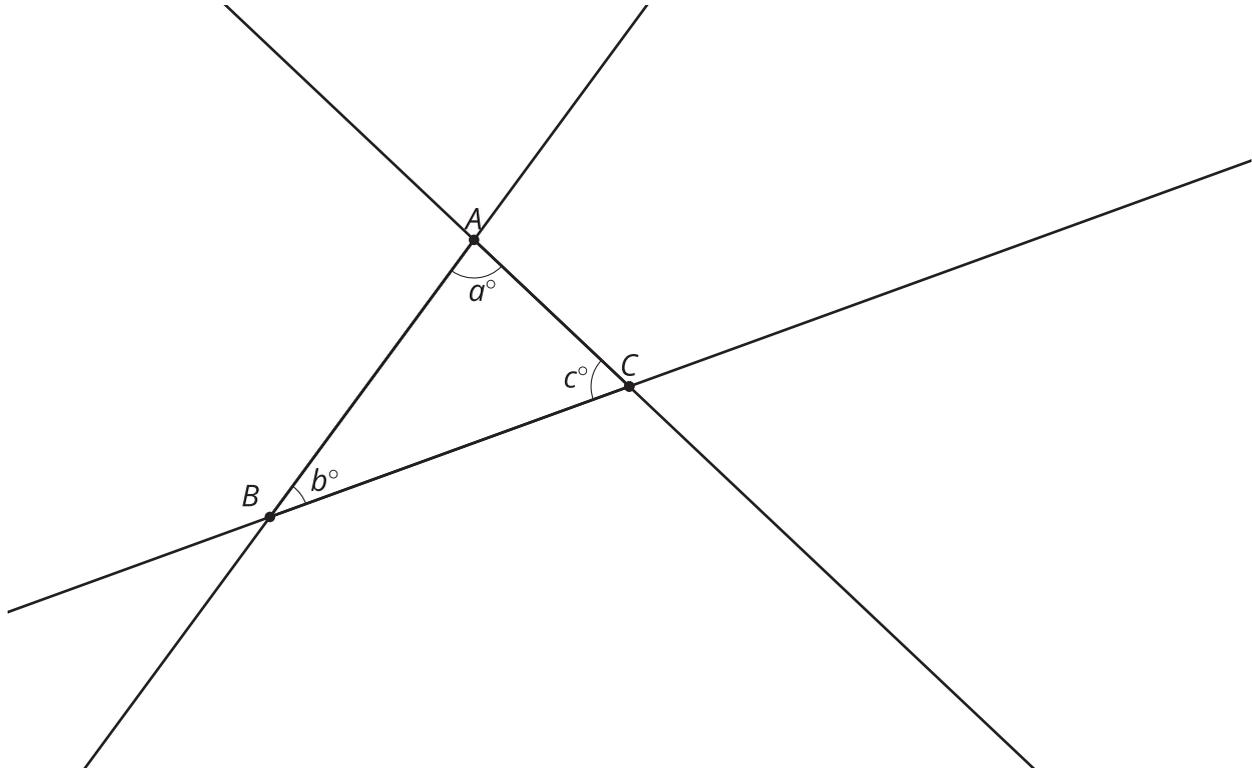
### Student Task Statement

1. Use a straightedge to create a triangle. Label the 3 angle measures as  $a^\circ$ ,  $b^\circ$ , and  $c^\circ$ .
2. Use paper folding to mark the midpoints of 2 of the sides.
3. Extend the side of the triangle without the midpoint in both directions to make a line.
4. Use what you know about rotations to create a line parallel to the line you made that goes through the opposite vertex.
5. What is the value of  $a + b + c$ ? Explain your reasoning.

### 3 Triangle Angle Sum Another Way

#### Student Task Statement

Here is triangle  $ABC$  with angle measures  $a^\circ$ ,  $b^\circ$ , and  $c^\circ$ . Each side has been extended to a line.



1. Translate triangle  $ABC$  along the directed line segment from  $B$  to  $C$  to make triangle  $A'B'C'$ . Label the measures of the angles in triangle  $A'B'C'$ .
2. Translate triangle  $A'B'C'$  along the directed line segment from  $A'$  to  $C$  to make triangle  $A''B''C''$ . Label the measures of the angles in triangle  $A''B''C''$ .
3. Label the measures of the angles that meet at point  $C$ . Explain your reasoning.
4. What is the value of  $a + b + c$ ? Explain your reasoning.

## Images for Activity Synthesis

$$a + b + c = 180$$

